OFFICE OF THE LIAISON OFFICER
FOR
SCHEDULED CASTES/TRIBES

Dear Friend,

We understand that you are a candidate for the probationary Engineer's test to be conducted by our Company. Therefore, we enclose a set of model question papers for you to feel the modality of the test. All the questions are of objective type with negetive marks for wrong answers. Please remember that these questions are only model question paper and may not appear in the test. While preparing the test, mere looking for the answers a or b or c or d is not sufficient but prepare yourself to the level up to the root level for the answers. We hope this tutorial material enclosed will be useful and you may be benefited. The undersigned thanks Management, SC/ST Welfare Association of our Organisation for their sincere encouragement and full co-operation to uplift the SC/ST candidates

Wish you all the best.

Thanking you,

Yours Sincerely

(T. K. RAJA)
Liaison Officer for SC/ST

ELECTRONICS I

1. The Gray Code equivalent of binary 1100 is
   a) 1011 b] 1101 c) 1010 d) 1100

2. A Multiplexer has
   a) Multiple inputs and Single output
   b) Single input and Multiple outputs
   c) Multiple inputs and Multiple outputs
   d) Multiple inputs for Storage of Data

3. A binary half adder
   a) adds two binary digits and produces their sum and carry
   b) adds half the sum to the carry
   c) adds two binary digits and carry from previous additicn
   d) adds two binary digits a* half the speed

4. An index register in a computer is for
   a) Arithmatic and logic functions b) storage of results
   c) Modifying the address c) counting the no. of programmes

5. An example of volatile memory is
   a) RAM b) ROM c) EPROM d) Magnetic Tape

6. Barrier voltage in a P-N junction is caused by
   a) thermally generated electrons and holes
   b) diffusion of majority carriers across the junction
   c) migration of minority carriers across the junction
   d) flow of drift current

7. The temperature coefficient of an intrinsic semiconductor is
   a) Positive b) Negative c) Zero d) Like metals

8. A silicon transistor has a leakage current Icbo = 1ma. If the temp. rises by 50°C the leakage current will be
   a) 30 ma b) 32 ma c) 50 ma d) No change

9. The noise figure of an ideal amplifier in decible is
   a) 0.5 b) 0 c) 1 d) 10

10. The rise time of an amplifier is 200 nsec. Its bandwidth is
    a) 70 MHz b) 140 MHz c) 100 MHz 1.75MHz

11. MOSFET operates in
    a) depletion mode only b) enhancement mode only
    c) depletion and enhancement mode d) None of the above

12. A device which behaves like SCRs is
    a) UJT b) Triac c) MOSFET d) SRD

13. A plate modulated Class C RF amplifier produces 100 KW of Radiated Power at 100% modulation. The modulating audio amplifier supplies approximately.
    a) 25 KW b) 33 KW c) 50 KW d) 66 KW

14. A 100 MHz FM carrier, modulated by a 5 KHz sine wave deviates by 50 KHz If the frequency of the modulating sine wave is doubled, the deviation will
a) Double b) Half c) Quadruple d) Have no change

15. Noise generated by a resistor is dependent on
a) Its value b) Its temperature
c) Both value and temperature d) None

16. A 32 channel 8 bit PCM system samples at 8 KHz rate. The overall bit rate in Kilobits per second will be
a) 2048 b) 2000 c) 1920 d) 64

17. Stub matching eliminates standing wave on
a) Load side of the stub b) Source side of the stub
c) Both sides c) On the stub

18. A half wave folded dipole has a radiation resistance of
a) 72 Ohms b) 50 Ohms c) 144 Ohms d) 288 Ohms

19. Top loading is used in antennas for
a) Decrease in impedance b) Increase in bandwidth
c) Increase in effective height d) Decrease the hieght

20. The term critical frequency in Ionospheric propagation is
a) Lowest frequency reflected by Ionosphere
b) Highest frequency reflected by the Ionosphere at veritical incidence
c) Lowest frequency reflected by the Ionosphere at vertical incidence
d] Lowest communication frequency possible

21. The cathode ray oscilloscope can be used to measure
a) Frequency b) Time interval c) Voltage d) All the above

22. A wein bridge is used for measurement of
a) Resistance b) Capacitance
c) Inductance d) Audio frequency

23. The frame rate per second used in Indian TV is
a) 60 b) 50 c) 25 d) 30

24. VHF signals are propogated
a) Via the ionosphere b) Along the ground
c) Through the troposphere d) By reflection in ionosphere

25. The impedance of a 3 element yagi antenna is around
a) 75 ohms b) 300 ohms c) 50 ohms d) 100 ohms

26. A PIN diode is microwave
a) oscillator b) Mixer d) detector c) switch

27. A transmission line of VSWR 2 has a reflection coefficient
a) 0.25 b) 0.5 c) 0.3 d) 0

28. Microwave repeaters are typically
a) 25 b) 50 c) 75 d) 100 Kms apart

29. To overcome fading in a ship-to-ship communication system we can effiectively use
a) Broadband Antenna b) Directional Antenna
c) Space Diversity d) Frequency Diversity

30. Frequency in the UHF range is propogate by waves of
a) Ground b) Sky c) Space d) Surface

31. A duplexer is used to
a) receive two signals in one antenna
b) prevent interference between two antennas
c) Mix two signals to the same antenna
d) allow one antenna for both transmission and reception

32. Straping is used in a magnetron to
a) prevent mode jumping b. reduce frequency drift
c) ensure proper bunching d) dissipate heat

33. A rectangular waveguide behaves like a Filter of
a) Bandpass b) Highpass c) Lowpass d) Bandstop

34. The silicon solar cell is a
a) photo conductive b) photo emissive
c) photo voltaic d) photo resistive

35. The signal propgation time in milliseconds for a geosynchronous satellite is
a) 540 b) 270 c) 135 d) 100

36. For the national TV and radio network, INSAT-IB uses
a) 400MHz b) 2.5 GHz c) 2.5 and 5 GHz d) 4 and 6 GHz

37. A typical fibre-optic detector is
a) step recovery diode b) light emitting diode
c) avalanche photo diode d) field effect transistor

38) A modem is a device used for
a) digitising voice data b) transmission of data on lines
c) Modulating and demodulating signals sent on a line
d) suppressing noise interference

39. The most effective anti-jamming technique is
a) Frequency hopping b) Spread Spectrum
c) Frequency synthesis d) Burst Transmission

40 Mono-mode is a term used in
a) Fibre-optics b) Radar c) Satellite Communication D) magnetics

41. Monopulse technique is used in
a) Radar b) Radio Relay c) Data communication d) Fibre-optics

42. HDLC is a term for
a) Data Communication Protocol b) Synchronising Pulses
c) Gain Control in Receivers d) Error checking

OFFICE OF THE LIAISON OFFICER
FOR
SCHEDULED CASTES/TRIBES

Dear Friend,

We understand that you are a candidate for the probationary Engineer's test to be conducted by our Company. Therefore, we enclose a set of model question papers for you to feel the modality of the test. All the questions are of objective type with negetive marks for wrong answers. Please remember that these questions are only model question paper and may not appear in the test. While preparing the test, mere looking for the answers a or b or c or d is not sufficient but prepare yourself to the level up to the root level for the answers. We hope this tutorial material enclosed will be useful and you may be benefited. The undersigned thanks Management, SC/ST Welfare Association of our Organisation for their sincere encouragement and full co-operation to uplift the SC/ST candidates

Wish you all the best.

Thanking you,

Yours Sincerely

(T. K. RAJA)
Liaison Officer for SC/ST

ELECTRONICS I

1. The Gray Code equivalent of binary 1100 is
   a) 1011 b] 1101 c) 1010 d) 1100

2. A Multiplexer has
   a) Multiple inputs and Single output
   b) Single input and Multiple outputs
   c) Multiple inputs and Multiple outputs
   d) Multiple inputs for Storage of Data

3. A binary half adder
   a) adds two binary digits and produces their sum and carry
   b) adds half the sum to the carry
   c) adds two binary digits and carry from previous additicn
   d) adds two binary digits at half the speed

4. An index register in a computer is for
   a) Arithmatic and logic functions b) storage of results
   c) Modifying the address c) counting the no. of programmes

5. An example of volatile memory is
   a) RAM b) ROM c) EPROM d) Magnetic Tape

6. Barrier voltage in a P-N junction is caused by
   a) thermally generated electrons and holes
   b) diffusion of majority carriers across the junction
   c) migration of minority carriers across the junction
   d) flow of drift current

7. The temperature coefficient of an intrinsic semiconductor is
   a) Positive b) Negative c) Zero d) Like metals

8. A silicon transistor has a leakage current Icbo = 1ma. If the temp. rises by 50°C the leakage current will be
   a) 30 ma b) 32 ma c) 50 ma d) No change

9. The noise figure of an ideal amplifier in decible is
   a) 0.5 b) 0 c) 1 d) 10

10. The rise time of an amplifier is 200 nsec. Its bandwidth is
    a) 70 MHz b) 140 MHz c) 100 MHz 1.75MHz

11. MOSFET operates in
    a) depletion mode only b) enhancement mode only
    c) depletion and enhancement mode d) None of the above

12. A device which behaves like SCRs is
    a) UJT b) Triac c) MOSFET d) SRD

13. A plate modulated Class C RF amplifier produces 100 KW of Radiated Power at 100% modulation. The modulating audio amplifier supplies approximately.
    a) 25 KW b) 33 KW c) 50 KW d) 66 KW

43. A gateway

a) is a place where Radars are connected
b) permits dissimilar networks to communicate
c) bifurcates the RF path of a transmitter d) is a feeder cable

44. Ethernet is a name of

a) medium of computer communication b) network for computer communication
c) procedures for computer communication network
d) software for computer communication

45. If several stations in a network want to use a single channel without interfering with one another, the technique used is called

a) carrier sense b) Phantom-freeze
c) Packet switching d) Multiplexing

46. In a monolithic IC, resistors are formed from

a) ceramic material b) copper
c) P-type semiconductor d) Aluminium deposition

47 ICs made by sputtering of materials on a ceramic substrate are called

a) Monolithic b) Hybrid c) Thickfilm d) Thinfilm

48. Two coils (inductors) connected in series have a combined inductance of 15uH. When terminals of one of the coils are reversed and connected to the other, the combined inductance is measured to be 9 uH. What is the value of Mutual inductance

a) 1.5 uH b) 3 uH c) 6 uH d) 12 uH

49. If a parallel LC circuit is excited at frequency less than its resonant frequency, the nature of its effective impedance is

a) Resistive b) Inductive c) Capacitive d) None of these

50. The wave length of 1 Giga Hertz frequency signal is

a) 10 cm b) 30 cm c) 3 cm d) 1 cm

51. Which of the following microwave tubes can be considered as broad band devices

a) Magnetrons b) Klystrons
c) Reflex Klystrons d) Travelling Wave Tubes [TWT]

52. Which family of the following Integrated Circuits has the highest speed

a) DTL b) ECL c) TTL c) CMOS

53. The most important feature of CMOS family of ICs is

a) High speed b) Small size
c) Low power consumption d) Low input impedance

54. What is the resolution of 8 bit A/D converter if its full scale voltage is 10V

a) 0.02 V 0.01 V c) 0.039 V d) 0.078 V

55. What value of resistance is to be used in LSB of 4 bit weighted ladder D/A converter if MSB has 10 K ohms resistor

a) 160 K b) 80 K c) 240 K d) 100 K

56. The pulsewidth of a radar transmitter is 0.6 u sec. and the pulse repetition rate is 700 Hz. The average power measured is 420 watts. What is the peak power

a) 100 KW b) 420KW c) 1 MW d) None of the these

57. The device used for isolating fhe transmitter and receiver in a radar system is called

a) Diplexer b] Duplexer
c) Directional Coupler d] None of these

58. "Baud" is

a) Total No. of bits/sec. in each character
b) Reciprocal of shortest signal element in a character
c) Duration of a character in Data transmission
d) Non of these

59. The advantage of Totem pole output stage in TTL ICs is

a) Low output impedance b] Can sink more current
c] Oscillations avoided d] None of these

60. The capacitance value of a Varactor is controlled by

a) a reverse voltage applied to it b) a series resistance
c) varying its supply voltage d) Current through the device

61. Electron volt is equivalent to

a) 3.8×10^{-20} erg b) 1.602×10^{-12} erg
c) 1.602×10^{-18} erg d) 1.602×10^{-16} erg

62. The kinetic energy of photo electrons emitted by a photo sensitive surface depends on

a) Intensity of the incident radiation
b) Wavelength of the incident radiation
c) Angle of incidence of radiation
d) Surface conditions of the surface

63. Flux is expressed in radio-metric system in

a) Lumens b) Photons c) Watts d) Candles

64. In a three-phase bridge rectifier circuit, the ripple frequency is

a) Same as line frequency b) Twice the line frequency
c) Thrice the line frequency d) Six times the line frequency

65. Energy stored in a capacitor as a function of voltage is given by

a) CV^2 b) $\frac{1}{2}\frac{V^2}{C}$
c) $1/2\ CV^2$ d) $\frac{1}{2}\frac{V}{C}$

66. The operational amplifiers used in analog computers have usually open loop flat gain approximately upto
a) 1 MHz b) 100 MHz c) 10 MHz d) 0.1 MHz

67. An oscilloscope of 350 MHz is fed with a pulse of rise time 2 n sec. The rise time of the displayed waveform is approximately
a) 1 n sec b) 2.2 n sec c) 2.0 n sec d) 1.7 n sec

68. A radar transmits a peak power of 100 Kilowatts with pulse width of 1 usec and a pulse repetition rate of 100 KHz. The average output power of the radar is
a) 100 KW b) 10 KW c) 1000 KW d) 50 KW

69. The incremental inductance in a coil is due to
a) Saturation b) Superimposed DC
c) Mutual inductance d) Change of frequency

70. Microwave tube based on velocity modulation principle is
a) Klystron b) Magnetron
c) Light house tube d) Travelling Wave Tube

71. Noise output from the receiver decreases uniformly with noise side band frequency for
a) Frequency modulation b) Amplitude modulation
c) Pulse amplitude modulation d) None of the above

72. In amplitude modulation the maximum permissible modulation index is
a) unity b) 100 c) infinity d) none of the above

73. In frequency modulation, the maximum permissible modulation index is
a) unity b) 50 c) 1000 d) no limit

74. In FM transmission and reception, the pre-emphasis and de-emphasis are used to improve the
a) singal to noise ratio
b) frequency response of the receiver
c) frequency response of the transmitter
d) the sensitivity of the transmitter

75. De-emphasis network uses the comibnation of
a) R – L b) R – C c) R – L – C d) Transformer

76. The usage of micro seconds for defining emphasis is a standard practice but this micro second definition means
a) 3 dB point of the network response
b) Mid point of the network response
c) Roll off the network response
d) The stop band ripple of the network response

77. Delayed AGC is applied
a) for all singal strength
b) for singal strength exceeding a specified limit
c) for low singal strength d) for FM receiver

78. Selectivity means
a) bandwidth b) gain
c) modulation index d) none of the above

79. Narrow bandwidth broadcast reduces
a) the quality and noise b) quality alone
c) noise alone d) quality and intelligibility

80. Squelch means keeping the receiver
a) ON in the absence of carrier
b) OFF in the absence of carrier
c) to remove AGC d) increase the AGC

81. Let Z be the series impendance and Y be the shunt admittance of the transmission line, then the characterstic impedance
a) $\sqrt{ZY}$ b) $\sqrt{Y/Z}$ c) $\sqrt{Z/Y}$ d) All the above

82. Noise figure of an amplifier is defined as
a) imput SNR output SNR b) input SNR / output SNR
c) output SNR / input SNR d) input SNR / gain

83. A broadcast radio transmitter radiates 10 KW power when modulation is 60%. Its carrier power will be
a) 8.47 KW b) 8.92 KW c) 8.31 KW d) 10.00 KW

84. In AM transmission antenna current is 8 Amphere at zero modulation index but increased to 8.93 Amphere when modulated on single sine wave. Then the % of modulation is approximately
a) 70.1% b) 80.1% c) 65.1% d) 10.0%

85. in AM transmission antenna current is 8 Amphere at zero modulation index. At 80% modulation index the antenna current will be
a) 10.00 A b) 8.72 A c) 9.19 A d) 9.79 A

86. If two sine waves are amplitude modulated with modulation index m1 and m2, the effective modulation index is
a) $\sqrt{m1^2/m2^2}$ b) $\sqrt{m1\ m2}$
c) $\sqrt{m1^2+m2^2}$ d) $\sqrt{m2^2/m1^2}$

87. If it is transmitted current and Ic is transmitter current at zero modulation index and the transmitted current at modulation index of m will
a) $It = Ic\sqrt{[1-m]}$ b) $It = Ic\sqrt{[1+m^2]}$
c) $It = Ic\sqrt{[1+m/2^2]}$ d) $It = Ic\sqrt{1+m^2}$

88. If Rr is the radiation resistance and Rd is the lumped resistance, then the antenna efficiency is given as–
a) (Rr – Rd) / (Rr + Rd) b) (Rr + Rd) / (Rr – Rd)
c) Rr / (Rr + Rd) d) Rd / (Rr + Rd)

89. In end fire array, the current
a) magnitude and phase in each element is the same
b) magnitude is the same but phase is different in each element
c) magnitude is different but no phase difference in each element
d) magnitude and phase are different in each element

90. In a broad side array, the current
   a) magnitude and phase in each element is the sam
   b) magnitude is the same but phase is different
   c) magnitude is different but no phase difference in each element
   d) magnitude and phase are different in each element

91. Beamwidth of the 2 metre paraboloid reflector at 6 GHz is
   a) 4.5° b) 9.25° c) 3.5° d) 7.75°

92. The cut of wave length for TE m, n mode is in a wave guide of dimension a × b is
   a) $2/\sqrt{(m/a)^2+(n/b)^2}$ b) $2\sqrt{[m/a]^2+[n/b]^2}$
   c) $\sqrt{(m/a)^2+(n/b)^2/2}$ d) $\sqrt{[m/a]^2+[n/b]^2}$

93. For the standard rectangular waveguide dimension of 4 × 2 cm the cut off wavelength for TM11 mode is approximately
   a) 1.788 cm b) 3.576 cm c) 1.682 cm d) 2.546 cm

94. In IMPATT diode, the voltage and current are
   a) in phase b) out off phase by 90°
   c) out off phase by 180° d) none of the above

95. Which of the following statement is true
   a) Tunnel diode & IMPATT diode are negative resistance devices
   b) Tunnel diode is positive resistance device and the IMPATT diode is negative resistance device
   c) Tunnel diode is negative resistance device and the IMPATT diode is positive resistance divice
   d) none of the above

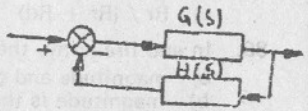
96. In a SSB modulation system, with 100% modulation index the power saving will be
   a) 5/6 of carrier power b) 2/8 of carrier power
   c) 5/12 of the carrier power d) 1/2 of the carrier power

97. In SSB modulation the modulation index is increased from 0.5 to 1.0, then the power will be increased by
   a) 2 times b) 4 times c) 16 times d) 32 times

98. 900 rpm is equal to
   a) 94.2 rad/sec b) 47.1 rad/sec
   c) 188.4 rad/sec d) 16.72 rad/sec

99. Darlington pair is used to
   a) increase the voltage gain b) increase the current gain
   c) decrease voltage gain d) decrease current gain

100. The transfer function of the system shown is



   a) G (s) / {1 + H (s) } b) G (s) H (s) / {1 + G (s) H (s) }
   c) G (s) / {1 + G (s) H (s) } d) G (s) / G (s) H (s)

ELECTRONIC II

1. Resistivity of Silicon in ohms cm. is approx. equal to
   a) 50 b) 10^{12} c) 230K d) 10^{-6}

2. Resistivity of Germanium in ohms cm. is approx. equal to
   a) 50 b) 10^{-12} c) 50K d) 10^{-6}

3. The number of free electrons/cubic cm of intrinsic silicon at room temperature is approx. equal to
   a) 1.5×10^{10} b) 2.5×10^{13} c) 10000 d) 5×10^{6}

4. The number of free electrons/cubic cm of intrinsic Germanium at room temperature is approx. equal to
   a) 1.5×10^{10} b) 2.5×10^{13} c) 1000 d) 5×10^{6}

5. The forbidden energy gap for Silicon is
   a) 1.1 eV b) 0.67 eV c) 0.97 eV d) 1.7 eV

6. The forbidden energy gap for Germanium is
   a) 1.1 eV b) 0.67 eV c) 0.97 eV d) 1.7 eV

7. N type material is formed by the addition of the following (penta valent) atom in n to semiconductor material
   a) Antimony b) Arsenic c) Phosphorous d) Any of the above

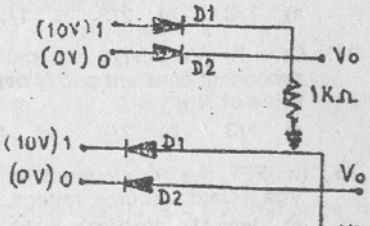
8. P type material is formed by the addition of the following [Trivalent] atom tn to semiconductor material
   a) Boron b) Gallium c) Indium d) Any of the above

9. Impurity atoms that produces N type material by its addition in semiconduvtor is called
   a) Donar b) Acceptor c) Conductor d) Insulator

10. Imputriy atoms that produces P type material by its addition in semiconductor is called
   a) Donar b) Acceptor c) Conductor d) Insulator

11. Dynamic resistance of a diode Rd is if voltage changes is △Vd and the curren change is △Id
   a) △Vd / △Id b) △Id / △Vd c) 1 / △Vd d) 1 / △Id

12. Point contact diodes are preferred at very high frequency than the junction diode, because of its low junction
   a) capacitance and inductance
   b) inductance c) capacitance



13. Identify the circuit given below
   a) AND Gate b) OR Gate
   c) rectifier d) NOR Gate

14. Identify the circuit given below
   a) AND Gate b) OR Gate
   c) rectifier d) NOR Gate

15. DC value of a Half wave rectifier with Em as the peak value of the input is
a) 0.318 Em b) 0.418 Em c) 0. 518 Em d) 0.618 Em

16. Change in Zener voltage of 10V at 100° C if temperature co-efficient is 0.072%° C as
a) 0.54 V b) 0.74 V c) 0.64 V d) 0.14 V

17. If Tc is the % temperature co of / ° C and Vz as zener voltage and T as change in temperature then the change in zener voltage is
a) $\frac{Tc\ Vz\ \Delta T}{100}$ b) $\frac{100\ Vz\ \Delta T}{Tc}$
c) 100. Vz. Tc ΔT d) None of the above

18. PIV for a full wave rectifier, if Em is the peak voltage is
a) Em b) 1.5 Em c) 0.636 Em d) 2 Em

19. Schottky Barrier diodes becomes important at
a) DC level operation b) Low frequency operation
c) High frequency operation d) None of the above

20. Clamping network is the one that will clamp the signal to a
a) different peak value b) different DC level
c) different polarity level d) different RMS level

21. Clipping network is the one that will clip a portion of the,
a) input signal without distorting the remaining portion
b) input signal with distorting the remaining portion
c) Any of the above d) None of the above

22. Transition capacitance Ct of a Varicap diode with Knee voltage Vt, reverse voltage Vr and K, the constant based on semiconductor material and the construction technique & N dependent on type of junction is given by
a) $1/K\ (Vt + Vr)^{N/2}$ b) $1/K\ (Vt + Vr)^{N}$
c) $K/\ (Vt + Vr)^{N}$ d) $K/\ (Vt + Vr)^{1/N}$

23. $Ct = K/\ (Vt + Vr)^{N}$ where Vt Knee voltage, Vr reverse voltagee, K manufacturing dependent constant and N dependent on type of junction, for alloy junction the value of N is
a) 1/3 b) 2/3 c) 1/2 d) 1/4

24. $Ct = K/\ (Vt + Vr)^{N}$ where Vt Knee voltage, Vr reverse voltage, K manufacturing dependent constant and N dependent on type junction, for diffused junction the value of N is
a) 1/3 b) 2/3 c) 1/2 d) 1/4

25. In JFET, the drain current Id is given by (Idss drain – source saturation current Vgs – Gate – source voltage, Vp the pinch off voltage)
a) Idss [1 – Vp/Vgs) b) Idss $(1 - Vgs/Vp)^2$
c) Idss [1 – Vgs/Vp) d) Idss $(1 - Vgs/Vp)^{3/2}$

26. The shadow mask in colour tube is used to
a) Reduce X-Ray emission
b) Ensure each beam hits its own dots
c) Increase screen brightness
d) Provide degaussing for the screen

27. Indicate which of the following signal is not transmitted in colour TV
a) Y b) Q c) R d) I

28. Another name for horizontal retrace in TV receiver is the
a) Ringing b) Burst c) Damper d) Flyback

29. Another name for the colour sync in the colour TV system
a) Ringing b) Burst c) Damper d) Flyback

30. The HV anode supply for a picture tube of a TV receiver is generated in the
a) Mains transformer b) Vertical output stage
c) Horizontal output stage d) Horizontal oscillator

31. The output of vertical amplifier is
a) Diract current b) Amplified vertical sync pulse
c) A sawtooth voltage d) A sawtooth current

32. In a transsistor if Alpha = 0.98, current gain is equal to
a) 29 b) 59 c) 69 d) 49

33. The active region in the common emitter configuration means
a) Both collector and emitter junction is reverse biased
b) The collector junction is forward biased and emitter junction reverse biased
c) The collector junction is reverse biased and emitter junction is forwared biased
d) Both collector & emittrr junction are forward biased

34. The saturation region in the common emitter configuration means that
a) Both collector & emitter junctions are reverse biased
b) The collector junction is forward biased and emitter function is reverse biased
c) The collector junction is reverse biased and emitter junction is forward biased
d) Both colletor & emittor junctions are forward biased

35. The % of Red, Green & Blue in 100% white Y is given by
a) 30%, 59%, 11% b) 50%, 30%, 11%
c) 30%, 11%, 50% d) 33.3%, 33.5%, 38.3%

36. Equalising pulse width, if H is the Horizontal sync rate
a) 0.64 H b) 0.07 H c) 0.04 H d) 0.16 H

37. In a simple RC network the bandwidth is equal to
a) $1/2\ \pi\ RC$ b) RC/2 c) $2\ C/\ \pi\ R$ d) $2\ \pi\ /RC$

38. The time constant of a RC network is given by
a) RC b) C/R c) R/C d(None of the above

39. First zero crossing of pulse frequency spectrum occurs at if d is the pulse width, T is the pulse repetition rate
a) 1/d b) d/T c) T/d d) T

40. The distortionless output characteristic of a network means
a) Constant amplitude and linear phase shift over frequency
b) Liner phase shift and amplitude need not be constant
c) Any amplitude and phase d) None of the above

41. Single sideband means suppressed
a) carrier b) carrier and one side band
c) one side band d) None of the above

42. In an amplitude modulated signal, lower side band frequency is equal to (if the carrier frequency is fc and modulating frequency is fm)
a) fm + fc b) fc – fm c) fm × fc d) fc/fm

43. Modulation index of the frequency modulation depends on
a) Amplitude & frequency of the modulating signal
b) Frequency and amplitude of carrier signal
c) Carrier frequency d) None of the above

44. The BW of the narrow band FM if modulating frequency is fm
a) 3 × fm b) 2 × fm c) 2.5 × fm d) 10 × fm

45. Reactance tube modulator is known for
a) FM b) AM c) PPM d) PAM

46. Bandwidth and rise time product is
a) 0.35 b) 0.45 c) 0.30 d) 0.49

47. Energy gap, Lg, for Germanium at room temp [300° K] is
a) 0.72 eV b) 1.1 eV c) 1.53 eV d) 0.2 eV

48. Volt equivalent of temperature VT, at 116° K is
a) 0.11 V b) 0.01 V c) 1.16 V d) 0.1 V

49. Reverse saturation current of a Ge. dicde is in the range of
a) mA b) uA c) nA d) pA

50. Cut-in voltage V for silicon is approximately
a) 0.2 V b) 0.6 V c) 0.9 V d) 1.1 V

51. Every 10° C rise in temp. the reverse saturation current
a) Doubles b) Halves c) Triplos d) No change

52. Hall effect with reference to Metal or Semiconductor carrying a current I is placed in a transverse magnetic field B, an electric field E is induced in
a) Parallel to B b) Perpendicular to I
c) Perpendicular to both B & I d) Perpendicular to B

53. 1 eV (electron volt) is equal to :
a) 1.9×10^{-20} J b) 1.6×10^{-19}
c) 1.6×10^{-20} J d) 1.16×10^{-19} J

54. Donar impurity is having a valency of :
a) 2 b) 3 c) 4 d) 5

55. Acceptor impurity is having a valency of
a) 2 b) 3 c) 4 d) 5

56. Electron volt arises from the fact that if any electron falls through a potential of 1 volt ,its kinetic energy will
a) decrease, & potential energy will increase
b) increase & potential energy decrease
c) be unaltered & potential energy decreases
d) increase & potential energy increase

57. Hole is created in a semiconducor material if one of following impurities are added
a) Antimony b) Arsenic c) Indium d) Phosphorcus

58. Excess electron is created by
a) Boran b) Gallium c) Indium d) Arsenic

59. A snubber circuit is used across the SCR to protect against
a) The di/dt of the anode current b) The dv/dt turn on
c) L. di/dt of load inductance d) None of the above

60. Germanium has the valency of
a) 2 b) 3) c) 4 d) 5

61. Silicon has the valency of
a) 2 b) 3 c) 4 d) 5

62. Hole acts as a free charge carrier of polarity
a) Negative b) Pasitive c) Neutral d) None of the above

63. Burst signal in NTSC System is 8 cycles of the frequency of
a) Colour sub carrier b) Picture carrier
c) Sound carrier d) None of the above

64. Colour sub carrier reference burst is superimposed on the
a) Back porch of the each horizontal sync pulse
b) Front porch of the each horizontal sync pulse
c) Front porch of the each vertical sync pulse
d) Back porch of the each vertical sync pulse

65. The law of mass action with reference to semiconductors technology states that the product of free nagative & positive concentration is a constant and
a) Independent of amount of donor and acceptor doping
b) Dependent on amount of donor and independent of the amount acceptor impurity doping
c) Depend on amount of both donor & acceptor impurity doping
d) None of the above

66. The snubber circuit used across SCR is a simple
a) R-L network b) RLC network c) LC network d) RC network

67. To limit the rate of rise of SCR anode current a small
   a) inductor is inserted in cathode circuit
   b) inductor is inserted in anode circuit
   c) capacitor is inserted in anode circuit
   d) capacitor is inserted in cathode circuit

68. Torque developed by a DC servo motor is proportional to the
   a) Product of power and time
   b) Product of armature current and back emf
   c) Armature voltage and armature current
   d) Field voltage and field current

69. Proportional Integral control
   a) Reduces steady state error but reduces the forward gain
   b) Increases the forward gain and reduces the steady state error
   c) Increases the steady state error and increases the forward gain
   d) None of the above

70. Increasing the servo bandwidth :
   a) Improves signal to noise ratio
   b) Improves speed response and lowers signal to noise ratio
   c) Improves power output d) None of the above

71. Notch filter is
   a) Low pass filter b) High pass filter
   c) Narrow stop band filter d) Narrow pass band filter

72. In TV Receivers the Electron beam deflection method used is
   a) Electro static b) Electro magnetic
   c) Magnetic d) All the above

73. In a line of sight communication the maximum range R in miles between the receiver antenna and transmitter antenna of height H in feet is approximately
   a) $R=1.93\sqrt{H}$ b) $R=1.23\sqrt{H}$
   c) $R=1.53\sqrt{H}$ d) $R=2.03\sqrt{H}$

74. The wavelenth of the 60 MHz carrier frequency is
   a 10 metres b) 15 metres c) 5 metres d) 2.5 metres

75. In standard TV receiving antenna the dipole element is
   a) 0.5 of the wave length b) 0.25 of the wave length
   c) 1.5 of the wave length d) 1.0 of the wave length

76. The characteristics of FET are similar to :
   a) Triode b) Tertode c) Pentode d) Diode

77. Charge coupled device is an array of capacitors whose structure is similar to :
   a) Shift register b) Flip – flop c) NAND gate d) amplifier

78. Operational amplifier characteristics are which of the following :
   a) Infinite gain b) Infinite input impedance
   c) Output impedance is zero d) All of the above

79. The typical value of the open loop gain in dB of an amplifier at DC with no feedback is :
   a) 90 to 100 b) 80 to 90 c) 0 to 50 d) 50 to 70

80. The 3 dB band width means the frequency at which
   a) The open loop voltage gain reduced to 0.707
   b) The open loop gain reduced to unity
   c) Maximum voltage of a singal is without distortion
   d) It is a medium wave band width of radio receiver

81. Rise time of an amplifier is defined as time required
   a) to change from 0 to 100% of its final value
   b) to change from 0 to 50% of its final value
   c) to change from 10 to 90 % of its final value
   d) to change from 10 to 100% of its final value

82. High speed amplifier design emphasized on
   a) extremely small bandwdith b) very slow response
   c) unity gain bandwidth after 10 MHz d) none of the above

83. Tuned amplifiers having the frequency range between
   a) 150 KHz – 50 MHz b) 100 Hz – 100 KHz
   c) 100 KHz – 120 KHz d) 50 MHz – 100 MHz

84. The resonance frequency of a tuned circuit made up of R, L, C is given by
   a) $1/2\pi\sqrt{LC}$ b) $2\pi\sqrt{LC}$ c) $2\pi/\sqrt{LC}$ d) $\sqrt{LC}/2$

85. The voltage follower can be obtained using operational amplifier
   a) without any feedback
   b) series parallel feedback of unity
   c) parallel parallel feedback d) series series feedback

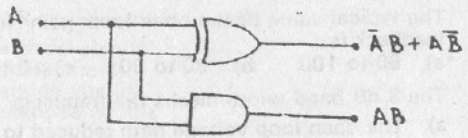
86. Fidelity of the amplifier is when
   a) it is a linear amplifier
   b) It does not add or substract any spectral components
   c) It amplifies each components by the same amount
   d) All of the above

87. What would be the output when two input sine waves of frequency 50 KHz and 100 KHz passed through an amplifier in the medium signal
   a) 50 KHz and 100 KHz b) 100 KHz and 200 KHz
   c) 50 KHz and 150 KHz d) All of the above

88. The important application of schmitt trigger is
   a) To convert slowly varying input voltage to abrupt voltage change
   b) To convert abruptly varying input voltage into slowly varying output
   c) To change the frequency of the input
   d) None of the above

89. Meaning of decoding is
   a) Binary addition b) Data transmission
   c) Demultiplexing d) Storage of binary information

90. Approximately how many number of gates are incorporated in SSI chip
   a) 12 b) 100 c) Excess of 100 d) Excess of 1000



91. The circuit diagram represents which one of the following
    a) Half adder b) Full adder c) Exor gate d) AND gate

92. Flip flop cannot be called as
    a) Bistable multivibrator b) 1 Bit memory unit
    c) Latch d) Combinational circuit

93. The important use of low pass filter in power supply is
    a) To get the regulation in the output voltage
    b) To filter out the ripple frequency
    c) To increase the current rating d) To convert AC into DC

94. Bina.y equalent of the decimal number 145 is
    a) 10010001 b) 1001011 c) 1010001 d) 1100010

95. In which of the following gate the output will be high when all the inputs are maintained at high level
    a) NOR b) AND c) NAND d) EXOR

96. Which of the following definition is true in the De Morgan's theorem
    a) Multiplication symbols are replaced by additioh symbol
    b) Addition svmbols are replaced by multiplication symbol
    c) Each of the terms are expressed in the complementary form
    d) All of rhe above

97. 8421/BCD code for a decimal number 149 is
    a) 0001 0100 1001 b) 10010101
    c) 10101001 d) None of the above

98. Combinational circuits are mainly characterized by
    a) Output depends upon the previous state & present state
    b) Output depends upon the input at that perticular instant
    c) Output depends upon the present state & the clock state
    d) Output does not depends upon the input at all

99. A flip flop is defind as
    a) A bistable device with two complementory outputs
    b) It is memory element
    c) it will repond to input and it is a basic memory element
    d) All of the above

100 Four bit code is called
    a) Nibble b) Byte c) Word d) Register

ELECTRONICS – III

1. The Noise figure of a receiver is a measure of :
   a) Excess noise generated b) Bandwidth of the receiver
   c) Gain of the receiver. d) Operating frequency

2. The Radio receiver is :
   a) Direct detection type b) Super regenerative type
   c) Super hetrodyne type d) None of the above

3. In an amplitude modulation system, the modulation index is dependent upon:
   a) Modulating frequency only b) Carrier amplitude only
   c) Modulating signal amplitude only
   d) Modulating and carrier amplitudes only

4. Image rejection mixer is generally used :
   a) To reject the unwanted signal b) To improve signal amplitude
   c) To improve noise figure d) To improve conversion loss

5. The value of a resistor creating thermal noise is doubled. The noise power generated is therefore :
   a) Halved b) Quadrapuled c) Doubled d) Unchanged

6. Indicate the false statement :
   a) HF mixers are generally noisier than HF amplifiers
   b) Impulse noise voltage is independent of bandwidth
   c) Thermal noise is independent of the frequency at which it is measured
   d) Industrial noise is usually of the impulse type

7. If the carrier of a 100 percent modulated AM Wave is suppressed the percentage power saving will be :
   a) 50 b) 70 c) 100 d) 66.6

8. A balanced modulator produces :
   a) The carrier and Two side bands
   b) The carrier and one side band c) Two side bands alone
   d) Carrier and a number of side bands

9. The frequency deviation in FM system is proportional to :
   a) Modulating frequency b) Carrier amplitude
   c) Modulating signal amplitude d) None of the above

10. In FM, the total transmitted power is :
    a) Dependent on modulating signal amplitude
    b) Dependent on modulating frequency
    c) Dependent on modulating index
    d) Independent of the above three

11. The carrier in an FM system disappears for the lowest modulation index of :
    a) 0.5 b) 1.0 c) 2.4 d) 3.5

12. The difference between phase and frequency modulation :
    a) is purely theoretical because they are the same in practice
    b) Is too great to make the two systems compatible
    c) Lies in the poorer audio response of phase modulation
    d) Lies in the different definitions of the modulation index

13. The overall noise figure of two cascaded amplifiers is equal to '
    a) The algebraic sum of the two
    b) The sum of the squares of the two
    c) The square root of the product of the two d) None

14. The noise power output of an amplifier is equal to :
    a) KTo BFG b) KTo FG
    c) KTo F/G d) KTo /FG

15. The effective noise temperature of an amplifier is equal to
    a) (F+1) To b) FTo
    c) (F—1) To d) None of the above

16. The noise figure of an amplifier depends upon
    a) Its bandwidth b) Its gain
    c) Its operating frequency d) None of the above

17. The Velocity of electromagetic wave in a coaxial cable is
    a) Equal to the velocity in free space
    b) Less than the velocity in free space
    c) Greater than the velocity in free space
    d) None of the above

18. The standing wave ratio [SWR] in a transmission line :
    a) Is proportional to the load impedance
    b) Is dependent on the source impedance
    c) Is a mis-match between the load and line
    d) Is a measure of its power handling capability

19. The standing wave ratio (SWR) is unity in a transmission line if
    a) The load impedance is equal to the characteristic impedance of the line
    b) The load impedance is twice that of the characteristic impedance
    c) The load impedance is half of the characteristic impedance
    d) None of the above conditions is necessary

20. The standing wave voltage node along a line repeats at the rate of if L is th wave length
    a) L/4 b) L/2 c) L d) 2L

21. A quarter wave line when short circuited at the far end behaves like
    a) Pure inductor b) Pure capacitor
    c) Parallel tuned circuit d) Series tuned circuit

22. The stub line used to match transmission line with a given load impedance, is generally
    a) Another open circuited line
    b) Another short circuited line
    c) Quarter wave transmission line
    d) Half wave transmission line

23. The smith chart generally covers a distance of '
    a) Quarter wavelength b) Half wavelength
    c) One wavelength d) Twice the wavelength

24. The component generally used to sample a portion of the energy transmitted in a line is
    a) Isolator b) Circulator
    c) Directional coupler d) None of the above

25. The return loss in a transmission line is a measure of
    a) Loss of the line b) Standing wave ratio
    c) Characteristic impedance of the line d) None of the above

26. The antenna can be considered as
    a) Matching the source and free space
    b) Matching the source to the line
    c) Matching the line and free space d) None of the above

27. The free space impedance is approximately equal to
    a) 177 ohms b) 277 ohms c) 377 ohms d) 50 ohms

28. The polarization refers to
    a) The physical orientation of the radiated wave
    b) The direction of propagation of the wave
    c) Direction perpendicular to the propagation of the wave
    d) None of the above

29. If u & e are the permeability and permittivity respectively. the characteristic impedance of the medium is given by
    a) ue b) $\sqrt{u/e}$ c) $\sqrt{e/u}$ d) $\sqrt{eu}$

30. The power density at a distance 'r' from an isotropic radiator with transmitted power P is :
    a) P/r^2 b) $P/2\pi r^2$
    c) $P/4\pi r^2$ d) None of the above

31. Frequencies in the UHF range is normally propagated by means of
    a) Ground waves b) Sky waves
    c) Surface waves d) Space waves

32. As electromagnetic waves travel in free space, only one of the following can happen to them
    a) Absorption b) Attenuation c) Reflection d) Refraction

33. High frequency waves are
a) Absorbed by the F2 layer b) Reflected by the D layer
c) Affected by the solar cycle
d) Capable of use for long distance communications on the moon

34. Indicate which one of following terms applies to troposcatter propagation
a) SIDS b) Fading
c) Faraday rotation d) Atmospheric storms

35. When microwave signals follow the curvature of the earth, this in known as
a) Faraday effect b) Ducting
c) Ionospheric reflection d) Tropospheric scattering

36. An ungrounded antenna near the ground :
a) Is unlikely to need an earth mat
b) Acts as a single antenna of twice the height
c) Must be horizontally polarized
d) Acts as an antenna array

37. One of the following consists of non-resonant antennas :
a) The folded dipole b) The rhombic antenna
c) The end fire array d) The broad side array

38. Balun is :
a) A circuit element to connect balance line to unbalanced antenna or line :
b) A circuit element to connect balance line to balanced line
c) A circuit element to connect unbalance line to unbalanced line
d) None of the above

39. The slotted line is used to measure :
a) Standing wave ratio b) Load impedance
c) Source impedance d) None of the above

40. In amplitude modulation Ec (1+m Sin Wmt) Sin Wot, each side band amplitude will be :
a) Ecm/2 b) Ecm c) Ec/m d) 2Ec/m

41. FM modulation becomes equivalent to AM modulation if
a) FM index is greater than 1
b) FM index is equal to 1
c) FM index is very much less than 1
d) FM index less than or equal to 1

42. S/N improvement of FM over AM, B is the FM modulation index
a) $3B^2$ b) B c) 2B d) B/2

43. Picture transmission in TV employs
a) Suppressed carrier modulation b) Vestigial side band
c) Single side band d) None of the above

44. Sound transmission in TV employ
a) Amplitude modulation b) Phase modulation
c) Frequency modulation d) Pulse amplitude modulation

45. One of the following is an indirect way of generating FM this is the :
a) Reactance FET modulator b) Varacter divide modulator
c) Amstrong modulator
d) Reactance bipolal transistor modulator

46. The modulation index of AM wave is changed from 0 to 1. The transmitted power is
a(Un-changed b) Halved c) Doubled d) Increased by 50%

47. The isbtropic antenna is represented by
a) Dipole antenna b) Rhombic antenna
c) Yagi uda antenna d) No such antenna exists in practice

48. The gain of parabolic reflector antenna is proportional to
a) The diameter of the reflector
b) Square of the diameter of the reflector
c) Aperture area of the feed d) None of the above

49. The parabolic reflector antennas are generally used to
a) Provide high gain b) Provide pencil beam
c) Increase bandwidth of operation d) None of the above

50. Cassegrain feed is used with a parabolic reflector to
a) Increase gain of the system
b) Increase the beamwidth of the system
c) Reduce the size of the main reflector
d) Allow the feed to be placed at a convenient point

51. A helical antenna is used for satellite tracking because of its
a) Circular polarization b) Maneuverability
c) Broad bandwidth d) Good front – to – back ratio

52. The discone antenna is
a) A useful directon finding antenna
b) Used as a radar receiving antenna
c) Circularly polarised like other circular antennas
d) Useful as a VHF receiving antenna

53. Waveguides are used mainly for microwave signals because
a) They depend on straight line propagation which applies to microwaves only
b) Losses would be too heavy at lower frequencies
c) There are no generators powerful enough to excite them at lower frequencies
d) They would be too bulky at lower frequencies

54. The wavelength in a waveguide
   a) Is greater than in free space
   b) Depends only on the waveguide dimensions and the free-space wavelength
   c) Less than the free space wavelength
   d) Equal to the free space wavelength

55. The dominant mode of propagation is preferred with rectangular waveguides because (indicate false statement)
   a) It leads to the smallest waveguide dimensions
   b) The resulting impedance can be matched directly to coaxial lines
   c) It is easier to excite than the other modes
   d) Propagation of it without any spurious generation can be ensured

56. The velocity of prypagation (group velocity) in a waveguide is
   a) Less than the free space velocity
   b) Greater than the free space velocity
   c) Equal to be free space velocity
   d) None of the above is correct

57. A wave can propagate in a waveguide if its cut off wavelength is
   a) Greater than the free space wavelength
   b) Less than the free space wavelength
   c) Equal to the free space wavelength
   d) None of the above statements is correct

58. The dominant mode in a rectangular waveguide is
   a) TE11 b) TE10 c) TE20 d) TM11

59. The characteristic wave impedance of a waveguide
   a) Depends on the mode of propagation
   b) Does not depend on the mode of propagation
   c) Is same as the free space impedance
   d) None of the above is correct

60. The dominant mode in a circular waveguide is
   a) TE01 b) TE11 c) TM01 d) TM11

61. A choke flange may be used to couple two waveguides
   a) To help in the alignment of the waveguids
   b) Because it is simpler than any other joint
   c) To compensate the discontinuities at the joint
   d) To increase the bandwidth of the system

62. A ferrite is
   a) A non-conductor with magnetic properties
   b) An inter metallic compound with particularly good conductivity
   c) An insulator which heavily attenuates magnetic fields
   d) A microwave semiconductor invented by faraday

63. The maximum power that may be handled by a ferrite component is limited by the
   a) Curie temperature b) Saturation megnetisation
   c) Line width d) Gyromagnetic resonance

64. The isolator is
   a) bidirectional b) Unidirectional
   c) Used to tap the power in a waveguide transmission line
   d) Used for none of the above purposes

65. Isolator is generally used :
   a) To protect the high power transmitter
   b) To protect receiver c) To protect the antenna
   d) To avoid arcing in waveguides

66. A TR tube is used
   a) To protect the high power transmitter
   b) To protect the receiver c) To avoid arcing in waveguide
   d) For none of the above purposes

67. Rieke diagrams are used to select best operating conditions for
   a) TWT amplifier b) Klystron oscillator
   c) Magnetron oscillator d) Cross field amplifiers

68. The cavity magnetron uses strapping to
   a) Prevent mode jumping b) Prevent cathode – back heating
   c) Ensure bunching d) Improve the phase – focussing effect

69. The gain bandwidth product of a microwave transistor FT, is the frequency at which the
   a) Alpha of the transistor falls by 3 dB
   b) Beta of the transistor falls by 3 dB
   c) Beta of the transistor falls to unity
   d) Power gain of the transistor falls to unity

70. The transferred – electron bulk effect occurs in
   a) Germanium b) Gallium arsenide
   c) Silicon d) Metal semiconductor junctions

71. One of the following is not used as a microwave mixer or detector
   a) Crystal diode b) Schottky – barrier diode
   c) Backward diode d) PIN diode

72. SAW devices may be used as :
   a) Transmission media like stripline b) Filters
   c) UHF amplifiers d) Oscillators at millimetre frequencies

73. Surface accoustic waves propagate in :
   a) Gallium arsenide b) Indium phosphide
   c) Stripline d) Quartz crystal

74. A parametric amplifier has an input and output frequency of 2.25 GHz, and is pumped at 4.5 GHz is a
a) Travelling wave amplifier b) Degenerate amplifier
c) Lower-side band upconverter d) Upper-side band upconverter

75. The negative resistance in a tunnel diode
a) Is maximum at the peak point of the characteristic
b) Is available between the peak and valley points
c) Is maximum at the valley point
d) May be improved by the reverse bias

76. Microwave links repeaters are typically 50 KM apart
a) Because of atmopheric attenuation
b) Because of output tube power limitations
c) Because of Earth's cuvature
d) To ensure that the applied voltage is not excessive

77. Microwave links are generally preferred to coaxial cable for television transmission because
a) They have less overall phase distortion b) They are cheaper
c) Of their greater bandwidths d) Of their relative immunity to impulse noise

78. A geostationary satellite
a) Is motionless in space (except for its spin)
b) Is not realy stationary at all, but orbits the Earth with a 24 hour period
c) Appears stationary over Earth's magnetic pole
d) Is located at a height of 35800 KM to ensure global coverage

79. The geostationary satellites launched by India are called
a) INTELSAT b) INSAT c) COMSAT d) MARISAT

80. Telephone traffic is measured
a) With echo b) By relative congestion
c) In terms of the grade of service d) in erlangs

81. A parametric amplifier must be cooled
a) Because parametric amplification generates a lot of heat
b) To increase bandwidth
c) Because it cannot operate at room temperature
d) To improve the noise performance

82. If the peak transmitted power in a Radar system is increased by a factor of 16, the maximum range will be increased by a factor of
a) 2 b) 4 c) 8 d) 16

83. If the antenna diameter in a radar system is increased by a factor of 4, the mtximum range will be increased by a factor of :
a) $\sqrt{2}$ b) 2 c) 4 d) 8

84. A high PRF will (indicate the false statement) :
a) Make the returned echoes easier to distinguish from noise
b) Make target tracking easier with conical scanning
c) Increase the maximum range
d) Have no effect on the range resolution

85. The bandwidth of a radar receiver is inversely proportional to the
a) Pulse width b) Pulse repetition frequency
c) Pulse interval d) Square root of the peak transmitted power

86. If d is the pulse width, T is pulse repetition period and P is the peak power, the duty ratio is
a) T/d b) P/T c) P/d d) d/T

87. If d is the duty ratio and P is the peak power in a pulsed transmitter, then the average power is
a) P.d b) P.2d c) P/d d) P/2d

88. If the return echo arrives after the allocated pulse interval
a) It will fnterfere with operation of the transmitter
b) The receiver might be overloaded
c) It will not be received
d) The target will appear closer than it really is

89. If the target cross section is changing, the best system for accurate angle traking is
a) Lobe switching b) Sequential lobing
c) Conical scanning d) Monopulse

90. After a target has been acquired the best scanning system for tracking is
a) Nodding b) Spiral c) Conical d) Helical

91. The doppler frequency increases as the target
a) Approaches the radar b) Recedes the radar
c) Moves perpendicular to the beam
d) Does not depend on the target velocity

92. The doppler effect is used in (indicate the false statement)
a) Moving target plotting on the PPI b) MTI System
c) FM Radar d) CW Radar

93. Solution to the blind speed problem is to
a) Change the doppler frequency b) Vary the PRF
c) Use monopulse d) Use MTI

94. The A-scope displays
a) Target position and range
b) Target range but not position
c) Target position but not range
d) Neither range nor position but only velocity

95. In the colour television system the sub carrier frequency in MHz is approximately
a) 3.58 b) 4.5 c) 45.75 d) 5.58

96. In television 4 : 3 : represents
a) The interlace ratio
b) The maximum horizontal deflection c) Aspect ratio
d) The ratio of the two diagonals of picture tube

97. Equalizing pulses in TV are sent during the :
a) Horizontal blanking b) Vertical blanking
c) The serrations d) Horizontal retrace

98. The number of lines per field in Indian Television System is :
a) 625 b) 312.5 c) 525 d) 262.5

99. The number of frames in Indian TV System is :
a) 50 b) 60 c) 25 d) 30

100. In a TV receiver the colour killer :
a) Cuts off the chromastages during monochrome reception
b) Ensures that no colour is transmitted to monochrome receivers
c) Prevents colour overloading
d) Makes sure that the colour burst is not mistaken for sync pulses

ELECTRONICS IV

1. The register is a
a) Simiplified unit of a subtractor
b) Cascaded group of the flip–flop
c) Binary ripple counter d) Data selector

2. The energy of the photo electron depends upon the following factor
a) Intensity of incident radiation
b) Quality of the photocathode
c) Frequency of incident radiation
c) Type of the incident light source

3. Hall effect is used to determine
a) Magentic flux b) Current density
c) Type of semiconductor material d) All of the above

4. Which one of the following is the thermistor
a) Semiconductor device b) Microwave device
c) Platinum resistance thermometer d) Thermo–couple device

5. Silicon is having direct band gap
a) True b) False c) No gape d) None of the above

6. Boron is doped in silicon to from
a) P – type b) N – type
c) Intrinsic d) None of the above

7. The concentration of impurity in doped silicon semiconductor per atom is
a) 10^{18} b) 10^{22} c) 10^{8} d) 10^{-22}

8. Conduction in P – type semiconductor is due to
a) Movement of hole b) Movement of electron
c) Movement of atoms d) Movement of electron–hole pair

9. Slope of electrical conductivity Vs temperature in semiconductor is
a) Positive b) Negativs c) Linear d) No effect

10. Volt equivalent of temperature of silicon at room temperature (300 deg K) is
a) 0.7 V b) 1.1 V c) 0.026 V d) 16 V

11. Carbon is not used as semiconductor because
a) It does not belong to silicon group b) It is a good conductor
c) It is not a conductor d) Band gap is very high

12. In forward bias of P–N junction depletion region
    a) Increases b) Decreases
    c) Remains the same d) Breaks down

13. Knee voltage in diode stands for
    a) Reverse break down voltage b) Saturation voltage
    c) Threshold of current conduction d) Peak inverse voltage

14. An ideal semiconductor diode for an AC input acts like
    a) Unidirectional switch b) Bidirectional switch
    c) Cuts off AC part d) Power booster

15. Reverse saturation current in P–N junction diode is due to
    a) Hole conduction b) Electron conduction
    c) Minority carrier conduction d) Majority carrier conduction

16. In the zener diode the break down in the reverse characteristic current is due to
    a) Electrons b) Hole
    c) Electron hole pair d) Crystalions

17. The petcentage of voltage regulation is def.ned as
    a) $\frac{V\ no\ load - V\ load}{V\ load} \times 100$
    b) $\frac{V\ load - V\ no\ load}{V\ load} \times 100$
    c) $\frac{V\ load - V\ no\ load}{V\ no\ load} \times 100$
    d) $\frac{V\ no\ load}{V\ load} \times 100$

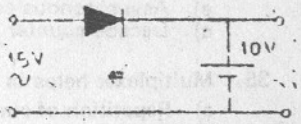
18. Filtering is effected by shunting the load with a
    a) Capacitor b) Resistor
    c) Inductor d) None of the above

19. Without applying the biasing voltage the transistor current would be
    a) Maximum b) Minimum c) No change d) Zero

20. In the transistor the doping at the emitter is much larger than the base, results in
    a) Emitter current entirely of holes
    b) Emitter current entirely of electrons
    c) Base current is due to electron–hole pair
    d) Emitter does contribute carriers which can reach collector

21. The largest current carrying component in P–N–P transistor is
    a) Electrons b) Holes
    c) Electron hole pair d) Silicon atoms

22. The circuit shown in the figure represents
    a) Rectifier
    b) Clamping circuit
    c) Clipping circuit
    d) Low pass filter



23. Clamping circuit is used for
    a) AC to DC conversion b) Biasing
    c) Limiting the amplitude d) Wave shaping

24. For ideal clipping circuit one should use a diode with cut-in voltage
    a) 0.7 V b) 1.1 V c) 0 V d) 0.2 V

25. The ratio of peak inverse voltage of full wave and half wave rectifier is
    a) 1 b) 2 c) 1/2 d) 1/4

26. Which of the following transistor configuration is a power amplifier
    a) Common emitter b) Common base
    c) Common collector d) All of the above

27. In a active mode of a transistor, collector conduction takes place due to
    a) Majority corrier b) Minority carrier
    c) Common collector d) All of the above

28. Common emitter configuration is used for a
    a) Current amplification b) Voltage amplification
    c) Current and voltage amplification
    d) Charge amplification

29. The transistor configuration where input is emitter and output is collector is called :
    a) Common emitter b) Common base
    c) Common collector d) Voltage follower (current gain)

30. Beta of a transistor is given by
    a) Ib/Ic b) Ic/Ib c) Ib/Ie d) Ic/Ie

31. Germanium transistor is preferred over silicon transistor in the following application
    a) High frequency b) High power
    c) Low voltage d) Power rectification

32. SCR is based on the principle of
    a) Voltage regeneration b) Current regeneration
    c) Power regeneration d) Power rectification

33. The number of clock pulses arriving at the Digital counter input, should be in the from of
    a) Decimal b) Binary c) Octal d) Hexadecimal

34. In which of the counter the clock input is common to all flip flops
   a) Asynchronous counter b) Synchronous counter
   c) Decade counter d) Down counter

35. Multiplexer helps in which of the following
   a) Repetition of slmilar circuit construction
   b) Selecting all the signals at the output at the same time
   c) Prevention of constructing similar circuits
   d) increase in the constructional costs due to repetition circuits

36. Full adder for two inputs can be developed with the help of
   a) Two half adder on OR gate
   b) One half adder and two OR gate
   c) An EXOR gate and and AND gate
   d) Two AND gates and an OR gate

37. The important use of Gray code is for a
   a) Ripple counter b) Full adder c) Encoder d) Decoder

38. In which of the code only one bit changes at each time
   a) BCD b) Aiken code c) Excess 3 cod d) Gray code

39. In Johnson code for N bits, the maximum number can be formed is given by an expression
   a) 2.N b) 2^N c) $2^N - 2N$ d) None of the above

40) The active mode of transistor operation is used in log circuits because of its
   a) Non linearity b) Linearity
   c) Switching nature d) High speed

41. Intermediate frequency in Television receiver is
   a) 26 – 46 MHz b) 1.6 – 2.3 MHz
   c) 455 -KHz d) None of the above

42. At abosolute temperature, a silicon crystal acts like an insulator because
   a) Electrons cannot move through a crystal
   b) Electrons are tightly held by other atoms
   c) Electrons can break away only by supplying energy
   e) All of the above

43. Extrinsic semiconductor is
   a) Doped with impurities b) Exists in the pure state
   c) N – type only d) Only P – type

44. The process of extracting the audio information from the modulated envolope is called
   a) Modulation b) Detection c) Transmission d) Oscillation

45. Selectivity of a radio receiver is defined as
   a) Ability to reproduce the otiginal frequencies
   b) Ability to eliminats wanted frequencies
   c) Ability to reject unwanted frequencies
   d) Ability to pick up the weak signal

46. Digital counter cannot be used as
   a) Clock b) Timer c) Event counter d) Multiplier

47. Distortion in the amplifier is due to
   a) Non linearity of the device
   b) Inductance present in the circuit
   c) Capacitance d) Stray effects

48. The purpose of RF amplifier tuning in the radio receiver is
   a) To reject all the frequencies
   b) To select all the frequencies
   c) Only to select required frequencies & amplification
   d) To vary the band width

49. The intermediate frequency used in the radio reciver is
   a) 455 KHz b) 1.6 MHz c) 20 MHz d) 60 MHz

50. The purpose of using tuned circuits between stages in the radio receiver is
   a) To increase the selectivity
   b) To increase the sensitivity
   c) To increase both selectivity and sensitivity
   d) To get the detector output

51. In an amplifier, the frequency characteristics may be divided into how many regions
   a) Two b) Three e) Four d) Zero

52. Op. amp. has high input impedance because
   a) High band width b) Differential Amplifier
   c) Current source at input end
   d) Common collector configuration

53. Gain of an OP amp. in inverting mode is $-\frac{Rf}{Rn}$ provided, the OP. amp. has
   a) Low output impedance b) Low input bias current
   c) High CMRR d) High open loop gain

54. Slew rate of an OP amp. is
   a) Change of O/P voltage with time b) Propogation speed
   c) Input RC time constant d) Off set voltage drift

55. Instrumentation OP amp. is used in applicatiosn where
   a] Two instruments are to be interfaced

b) Input is very low level singal c) DC singals are involved
d) Differential singals are involved

56. An OP amp. integrater will be
a) Capacitor at input b) Diode at input
e) Diode feed back d) Capacitor feed back

57. A logrithemic amplifier will have
a] Inductor feed back b) Diode feed back
c] Resistance feed back d) Thermistor feed back

58. OP amp. can be converted into capacitor by
a) Increasing bandwidth b) Removing feed back
c) Increasing input impedanbe d) Positive feed back

59. Comparators are used as
a) Switching device b) Linear amplifiers
c) Power amplifiers d) High speed amprifiers

60. Typical output impedance of 741 OP amp. is
a) 0.5 ohms b) 1 K ohms c) 1 ohms d) 75 ohms

61. Typical unity gain bandwidth of 741 OP amp. is
a) 10 MHz b) 100 KHz c) 1 MHz d) 1.5 MHz

62. OP. amp. wein bridge oscillator works when the over all gain is
a) 180 b) 3 c) 1.2 d) 125

63. Important part in a electronic voltage regulator is
a) Error amplifier b) External pass transistor
c) Reference voltage diode d) All the above

64. To generate a triangular wave form from a square wave
a) Differentiater is used b) Integrator is used
c) Logrithemic amplifier is used d) Clipping circuit is used

65. For multiplying two analog signals which one of the following is used
a) Comparator b) Hall effect device
c) Gunn diode d) Tunnel diode

66. Which of the following device is used as an electronic memory element
a) Astable multivibrator b) Monostable multivibrator
c) Magnetic tape d) None of the above

67. Phase sensitive detecfor in lock-in-amplifier is used
a) To increase the sensitivity of an instrument b) To limit the badwidth
c) To increase the dynamic ange of the signal
d) To increase the input impedance

68. In television transmission video signal is
a) Frequency modulated b) Amplitude modulated
c) Phase modulated d) Delta modulated

69. The Boolean function XYZ + YZ + XZ, after simplification gives
a) X b) Y c) Z d) X + Y + Z

70. Extremely low power dissipation and low cost per gate can be achieved in
a) MOS ICs b) CMOS ICs c) TTL ICs d) ECL ICs

71. Which of the following digital IC families can give maximum fan-out
a) ECL b) PMOS c) HTL d) CMOS

72. A punched card has
a) 22 rows, 90 columns b) 12 rows, 80 columns
c) 12 rows, 2 columns d) 8 rows, 128 columns

73. Which one of the following is a 16 bit microprocessor
a) Zilog 80 b) Intel 8085 c) Motorola 6800 d) Intel 8086

74. $(0.3125)_{10}$ when converted to base 8 gives
a) $(0.16)_8$ b) $(0.26)_8$ c) $(0.24)_8$ d) $(0.124)_8$

75. Excess – 3 code is a
a) Weighted code b) Cyclic code
b) error correcting code d) Self complementing code

76. ASC II code is a
a) Error detecting code b) Self correcting code
c) An alphanumeric code d) A weighted code

77. Modulo – 2 addition is represented by
a) f = XY + XY b) f = XY + XY
c) f = X + XY d) f = XY + XZ + YZ

78. Which one of the following Boolean identities is correct ?
a) XYZ + YZ + XZ = YZ + XZ b) XYZ + YZ + XZ = XY + XZ
c) XY + XZ = XY + XZ + YZ d) X + XY = XY

79. SN7410 IC is a
a) Quad 2 input NAND gate b) Triple 3 input NAND gate
c) Dual M/S J-K flip flop d) None of these

80. Intel 8085 microprocessor has two registers known as primary data pointers These are
a) Registers V&C b) Registers D&E c) Registers H&L d) None of these

81. Intel 8080 microprocessor has an instruction set of 91 instruction. The op-cod to implement the instruction set should be at least
a) 6 bit b) 7 bytes c) 7 bif d) 8 bit

82. A microprogrammed computer can have the following memories in its contro memory unit
a) Semiconductor ROM b) Semiconductor RAM
c) Magnetic RAM d) None of these

83. In digital circuits parallel operation is preferred because
a) it requires less memory b) circuitry is simple
c) it is faster than series operation
d) for none of the above reasons

84. SN 7401 IC is a
a) Quad 2 input NAND gate
b) Quad 2 input NAND gate with open collector output
c) Quad single input NAND gate with open collector output
d) None of the above

85. What is the binary code of $(26)_{10}$?
a) 11001 b) 10001 c) 11010 d) 10100

86. The basic RS flip flops is
a) a bistcble multivibrator b) a monostable multivibrator
c) an astable multivibrator d) None of the above

87. The input impedance of an operational amplifier is
a) Very small b) Zero
c) Very high but not infinite b) Infinite

88. SN 7411 is
a) OP amp. monolithic and short circuit protection in-built
b) Two input NAND gate
c) Three input NAND gate with open collector output
d) None of the above

89. The output voltage of an operational amplifier is
a) 90 deg out of phase from the input
b) -90 deg out of phase from the input
c) 45 deg out of phase from the input
d) 180 deg out of phase from the input

90. The equivalent octal number of $(492)_{10}$ is
a) 574 b) 547 c) 754 d) 758

91. The equivalent decimal number for Gray code 1011 is
a) 14 b) 13 c) 41 d) 31

92. The output will be only if all inputs go to 1 in case of
a) OR gate b) AND gate c) NAND gate d) NOT gate

93. Which of the following circuits is known as half adder ?
a) AND circuit b) OR circuit
c) Exclusive OR circuit d) None of these

94. Which of the following memories is used to store variable quanties of the data ?
a) RAM b) ROM c) PROM d) EPROM

95. Large scale Integrated (LSI) circuits usually contain
a) less than 10 gates b) 10 to 100 gates
c) more than 100 gates d) more than 1000 gates

96. The Boolean expression A + AB + B on simplification can be reduced to :
a) 0 b) 1 c) A + B d) A + B

97. For realising a decade counter using flip-flops the minimum number of flip flops required is
a) 4 b) 5 c) 6 d) 10

98. Which logic family is widely used in SSI & MSI applications ?
a) ECL b) DTL c) TTL d) None of these

99. An amplitude modulation detector detects
a) the peak value of the modulation signal
b) the envelope of the modulating signal
c) the peak value of the carrier signal
d) the average value of the carrier signal

100. Microwave (MW) links are generally prefered to coaxial cable for TV transmission because :
a) they have less overall phase distortion
b) they are cheaper
c) of their greater bandwidth
d) of their relative immunity to impulse noise

ELECTRONICS – V

1. VSWR on a transmission line is always
   a) equal to 1 b) equal to 0
   c) less than 1 d) greater than 1

2. In an amplitude modulated wave, the value of Vmax is 10V and Vmin is 5V. The % modulation in this case is :
   a) 2% b) 33.3% c) 50% d) 100%

3. The signal to noise ratio at the input of an amplifier can be improved :
   a) by decreasing the source impedance or resistance
   b) by increasing the source impedance
   c) by matching the source impedance with the input impedance of the amplifier
   d) None of the above

4. If the bandwidth of an amplifier is reduced, the thermal noise in the amplifier will :
   a) increase b) decrease
   c) not to be affected at all d) become random in nature

5. For the distortion to be minimum in a transmission line at audio frequencies, the codition is
   a) L = CR/G b) L = GR/C
   c) LG = R d) LR = G

6. When electromagnetic waves are propagated in a waveguide
   a) they travel along the broader walls of the waveguide
   b) they travel through the delectric without touching the wall
   c) they are reflected from the walls but they do not travel along them
   d) None of the above

7. Communication between setellite and ground station is through
   a) Tropospheric scatter c) ground wave
   c) sky wave d) line of sight propagation

8. A mast antenna is used mainly for
   a) UHF b) Short wave c) Medium wave d) VHF

9. A crystal wuich has a sensitivity of –55 dBm with 1 MHz BW amplifier will have a sensitivity at 4 MHz BW amplifier equal to :
   a) –55 dBm b) –58 dBm c) –52 dBm d) –60 dBm

10. Electromagnetic waves are refracted when they
    a) pass into a medium of different dielectric constant
    b) are polarised at right angles to the direction of propagation
    c) encounter a perfectly conducting surface
    d) pass through a small slot in a conducting mediom

11. An aerial is fed from an amplitude modulation amplifier. Both the modulating voltage and modulated voltage are sinusoidal. The aerial current (rms) before modulation is 5A and it increases to 5.8A after modulation. The percentage of madulation index will be
    a) 88% b) 80% c) 81.21% d) 83.14%

12. In a frequency demodulation, Foster–Seeley discriminator uses a
    a) Single tuned circuit
    b) double tuned circuit in which both the primary and secondary are tuned to the same frequency
    c) double tuned circuit in which both the primary and secondary are tuned to different frequencies
    d) combination of two transistors in push–pull operation

13. The wavelength of an electromagnetic wave in wave guide
    a) is directly proportional to the phase velocity
    b) is inversely proportional to the phase velocity
    c) is greater than that in free space
    d) depends only on the wave guide dimensions and the free space wavelength

14. The scale used for moving coil meter is
    a) non–linear scale b) Linear scale
    c) a square scale d) a log scale

15. To double the current range of a 50 uA, 2000 ohms meter movement, the shunt resistance required is
    a) 40 ohms b) 50 ohms c) 2000 ohms d) 25 K ohms

16. A voltmeter utilises a 20 uA meter movement. The sensitivity of the voltmeter is
    a) 50 meg ohms per volt b) 20 K ohms per volt
    c) 50 Kilo ohms per volt c) 20 meg ohms per volt

17. A transformer, with a 20 : 1 voltage step–down ratio has 6V across 0.6 ohm in the secondary, then I_s and I_p given by
    a) 10A, 5A b) 5A, 10A c) 10A, 0.5A d) 1A, 0.5A

18. The temperature coefficient of resistance of a resistor is
    a) negative b) positive c) zero d) infinity

19. To prevent loading of the circuit under test, the input impedance of the oscilloscope
    a) be low b) be high c) capacitive d) inductive

20. If the retrace is visible on the CRT display, then the trouble may be that
    a) The flyback time of the time base saw tooth wave is not zero
    b) The blanking control is not set properly
    c) There is loss of SYNC signal d) The intensity is too high

21. The lissajous pattern on CRO for two sinusoids of frequency ratio 1 : 2 differing in phase by 90 degress, is
a) a straight line b) a circle c) an ellipse d) an eight – shaped

22. When an electron starts from rest under the influence of electric and magnetic fields perpendicular to each other, the path traversed by it will be
a) ellipse b) a parabola
c) strainght line d) a cycloid

23. Frequency multipliers are usually
a) Class A amplifiers b) Class B amplifiers
c) Class C amplifiers d) Clsss AB amplifiers

24. The feedback network of a phase shift oscillator is usually consist of
a) RC circuit b) RL circuit c) LC circuit d) C alone

25. Common base amplifier is most suitable for use in
a) Very high lrequency circuits b) Low frequency circuits
c) Medium frequency circuits d) Low current circuits

26. If two amplifiers having identical bandwidth are cascaded, then the bandwidth of the resulting amplifier will be
a) less than that of each stage b) greater than that of each stage
c) same as that of each stage d) double of each stage

27. Which one of the following amplifiers has largest bandwidth
a) RC coupled amplifier b) Difference amplifier
c) Transformer coupled amplifier d) Direcf coupled amplifier

28. In an amplifier, the emitter resistance by passed by a capacitor
a) reduces the voltage gain b) iecreases the voltage gain
c) causes thermal runaway d) None of the these

29. The term free running is usually associated with
a) Bistable multivibrator b) Astable multivibrator
c) Monostable multivibrator d) None of the above

30. The signal fed at the input of an ideal push-pull amplifier has fraquency compoonents 150 Hz' 300 Hz, 450 Hz and 600 Hz. The output signal will contain
a) only 150 Hz frequency component
b) only 150 Hz ana 450 Hz frequency component
c) only 300 Hz and 600 Hz faequency components
d) All the frequency components

31. For which of the following configuration [s] does the input resistance of the amplifier depend strongly on the load resistance
a) CE b) CC c) CB d) CE and CB

32. An important advantage of the RC coupling scheme is
a) Economy b) Excellent frequecy response
c) High efliciegcy d) Good impedance matching

33. The AC input to transistor oscillator is obtained from
a) the previous stage b) a signal generator
c) Dc power source d) its own internal circuit

34. The low frequency cut-off in an amplifier is due to
a) only coupling capacitor b) only bypass capacitors
c) both coupling and bypass capacitors
d) the internal transistor junction capacitances

35. In a half-wave rectifier the peak value of AC voltage across the secondary of the transformer is 20 /2 V. If no filter circuit is used, the maximum DC voltage across the load will be
a) 28.28 V b) 20 V c) 14.14 V d) None of these

36. Heat sinks ate used in a transistor working as power amplifier so as to
a) increase the output power b) reduce the heat losses in toe transistors
c) Increase the voltage gain of the amplifier
d) increase the collector dissipation rating of the transistors

37. In a power amplifier, the output power is proporational to
a) Vi b) Vi^2 c) Vi^3 d) $\sqrt{Vi}$

38. At half power frequencies the reduction in voltage gain of an amplifier equals
a) 6 dB b) 2 dB c) 3 dB d) 4 dB

39. The frequency of the ripple voltage at the output of a bridge rectifier operating from a 50 Hz supply is
a) 25 Hz b) 50 Hz c) 100 Hz d) 200 Hz

40 Darlington pair is used for
a) High current gain b) High power gain
c) Htgh frequency operation d) Low distoration

41. The function of a bleeder resistor in a power supply is
a) same as that of a load resistor
b) to ensure a minimum current drain in the circuit
c) to increase the output currenr
d) to increase the output DC voltage

42. A JFET has a potential divider bias arrangement. By mistake the resistor between the gat and the power supply terminal is removed. The JFET will
a) continue to work as an amplifier
b) Have a forward bias gate with respect to source
c) Not work as an amplifier but will work as a switch
d) Immediately burn out

43. The ripple factor of half-wave rectifier is
a] 0.482 b] 1.11 c] 1.21 d] 1.57

44. In the high frequency region of an RC coupled amplifier the circuit behaves like a
a] differentiator b] a current amplifier
c] low pass filter d] high pass filter

45. Astable multivibrator can be used as
a] squaring circuit b) comparator circuit
c] voltage to frequency converter
d] frequency to voltage converter

46. If the gain of the amplifier is A and the voltage feedback is fraction B of the amplifier output voltage, the condition for maintenance of oscillations is
a] AB = 1 $\angle 180°$ b] AB = infinity
c] AB = 1 $\angle 0°$ d] AB << 1

47. Nominal gain of an amplifier is 240. The noise level in the output without feedback is 300 mV. if a feedback Beta = 1/60 used, the noise level in the output will be
a] 1.66 mV b] 2.4 mV c] 4 mV d] 20 mV

48. A zener diode is primarily used for
a] rectification b) producing constant current
c] producing constant voltage d] reverse bias

49. Cross over distrotion is eliminated in a push-pull amplifier by
a] using a transformer with a large step-up ratio
b] Using a transformer with a large step-down ratio
c] Providing a small forward bias to the transistors
d] supplying both transistors with inphase signals

50. When a PNP transistor is saturated
a] its base, emitter, and collector ars all essentially at the same potential
b] its emitter is at higher potential than the collector
c] its collector is at higher petential than both base & emitter
d] None of the above

51. For a RC High pass circuit
a] RC << t b] RC << t c] RC = t d] None of these

52. An inverter is an equipment for transforming
a] AC to DC b] AC to AC c] DC to DC d] DC to AC

53. Suppose you wish to amplify the potential difference between two points in a circuit when neither of these points is grounded. Which one the following will you prefer ?
a) RC coupled amplifier b) Transformer coupled amplifier
c) Difference amplifier d) Direct coupled amplifier

54. In an emitter follower, the output voltage is
a) 180° out of phase from the input voltage
b) 90° out of phase from the input voltage
c) in phase with the input voltage
d) None of these

55. A silicon controlled rectifier can be considered to be :
a) two pnp transistors connected back to back
b) two npn transistors connected back to back
c) one npn and one pnp transistor connected back to back
d) Two zener diodes connected back to back

56. A rf signal contains three frequency components 870 KHz, 875 KHz 880 KHz. This signal needs to be amplified. The amplifier used should be
a) Audio frequency amplifier b) Wide band amplifier
c) Push pull amplifier d) None of these

57. In the emitter follower circuit
a) The output current and voltage are inphase with the input current and voltage respectively
b) The input and output impedances are equal
c) There is current series negative feedback
d) The output impedance is much higher than the input impedance

58. The frequency response of a system is the range of frequencies between the upper and lower
a) 1 dB points b) 6 dB points
c) 3 dB points d) None of the above

59. In a class C amplifier the output current is zero for
a) half cycle b) full cycle
c) less than half cycle d) more than half cycle

60. When R_L [load resistance] equals the internal resistance of a generator, which of the following is maximum :
a) power in R_L b) current through R_L
c) voltage across R_L d) effeciency of the circuit

61. Nagative feedback in an amplifier results in :
a) increased gain and increased bandwidth
b) increased gain and reduced bandwidth
c) reduced gain and increased bandwidth
d) reduced gain and reduced bandwidth

62. A class B push–pull amplifier suffers from
a) Cross–over distortion b) Excessive harmonic distortion
c) Inter modulation distortion d) None of the above

63. An oscillator of the LC type that has split capacitor in the tank circuit is
a) Hartley oscillator b) Wein bridge oscillator
c) Colpitts oscillator d) None of the above

64. Clamping circuits are also known as
a) AC restorer b) DC restorer
c) Voltage to frequency converter d) None of the above

65. Which of the following has the greater mobility
a) Positive ion b) Negative ion c) Electrons d) Holes

66. An N type semiconductor as a whole is
a) Positively charged b) Electrically neutral
c) Negatively charged d) None of these

67. In a semiconductor, the forbidden energy gap is of the order
a) 1 ev b) 6 ev c) 7 ev d) 0.1 ev

68. In LED, light is emitted because
a) Recombination of charges take place
b) We make the light fall on LED
c) Diode emits light when heated
d) None of the above

69. UJT is also called
a) a voltage controlled device b) a current controlled device
c) A relaxation oscillator d) None of these

70. The transistor configuration which provides higher output impedance is
a) CC b) CB c) CE d) None of these

71. Tunnel diodes are fabricated from
a) silicon b) germanium
c) either silicon or germanium d) either germanium or gallium arsenide

72. N channel FETs are superior to P channel FETs because
a) they have a higher input impedance
b) they have a high switching time
c) they consume less power
d) mobility of electrons is greater than that of holes

73. Diac is a solid state device which works as a
a) 2 terminal bidirectional switch
b) 2 terminal unilaternal switch
c) 3 terminal bidirectional switch d) Nona of the these

74. Triac is a solid state device which works as a
a) 2 terminal bidirectional switch
b) 3 terminal bidirectional switch
c) 4 terminal bidirectional switch
d) 3 terminal unilateral switch

75. Compared to a CB amplifier, a CE amplifier has
a) lower input resistance b) higher output resistance
c) lower current amplification
d) higher current amplification

76. The input and output signals of a common emitter amplifier are :
a) always equal b) out of phase
c) in phase d) always negative

77. The operation of a JEET involves
a) a flow of minority carriers b) a flow of majority carriers
c) recombination d) nagative resistance

78. Solar cell is an example of a
a) photo conductive device b) photo emissive device
c) photo voltage device d) None of these

79. Bretters and bolometers are used in the measurement of
a) Microwave power b) VSWR c) Transmission losses d) None of these

80. A klystron operates on the principle of
a) Velocity modulation b) Amplitude modulation
c) Pulse modulation d) Frequency modulation

81. The unit of the amplification factor of a triode is
a) decibels b) volt c) neper d) none of the above

82. A change in base current from 30 to 40 mA changes the collector current from 500 to 900 mA. The B factor for this power transistor equals
a) 900 b) 500 c) 3 d) 40

83. The field effect transistor can be used as
a) Variable capacitance b) A constant voltage source
c) A variable resistance d) A constant current source

84. Why NPN transistors are preferred over PNP transistors
a) NPN transistors have low heat dissipation
b) NPN transistors can handle large power
c) NPN transistors are cheap and easily available
d) None of these

85. The germanium transistors are seldom used above
a) 60 °C b) 75 °C c) 125 °C d) 175 °C

86. In a FET the drain voltage above which ther is no increase in the drain current is called
a) pick off voltage b) critical votlage
c) pinch off voltage d) break down voltage

87. A reflex klystron has
a) only one cavity working both as the buncher & the catcher
b) two cavities one for buncher and one for the catcher
c) three cavities, two for buncher and one for catcher
d) No cavity at all

88. Bipolar junction transistors are seldom used as switching devices because
a) BJTs are not economical for using as switching devices
b) they can handle only high voltage but not high currents
c) they need separate circuits when used as switching device
d) of slow response and inability to withstand high voltage

89. The voltage at which the electron flow starts from the anode is called
a) break down voltage b) peak inverse voltage
c) peak voltage d) pinch off voltage

90. The heater filament of a vacuum tube is generally supplied with AC voltage (and not DC voltage) for heating because
a) it results in a uniform heating of filament so that the electron emission is also uniform
b) it is very easy to obtain AC voltage from AC powermains
c) the DC voltage that would be required for heating has much greater magnitude than the AC voltage
d) When DC is used for heating, a different type of filament is required which is very expensive

91. The dopant used ror P type semiconductor is
a) Phosphorous b) Boron c) Carbon d) Sodium

92. An example of negative resistance characteristic device
a) BJT b) MOSFET c) UJT d) PINdiode

93. The average DC voltage obtained from a bridge rectifier with a sine wave input V sin wt is
a) $\sqrt{2}$ d) 2 V c) 4 V d) V

94. The maximum theoretical efficiency of a class B amplifier is
a) about 20% b) about 50% c) about 75% d) 100%

95. A cascode amplifier is
a) A CE amplifier followed by CC amplifier
b) A CE amplifier followed by CB amplifier
c) A CC amplifier followed by CB amplifier
d) A CB amplifier followed by CE amplifier

96. Toggle switches can be debounced using
a) Astable multivibrator b) Shift register
c) RS flip flop d) None of these

97. A band pass filter has a centre frequency at 5 KHz. The 3 dB cut off frequencies are 4.5 KHz and 5.5 KHz. The Q factor of the filter is
a) 5 b) 0.2 c) 5.2 d) 0.45

98. The domestic buzzer makes uae of
a) Hall effect b) Tunnelling effect
c) Natural resonance d) Piezoelectric effect

99. The device which uses avalanche breakdown is
a) PIN doide b) Zener diode
c) Impatt diode d) GUNN diode

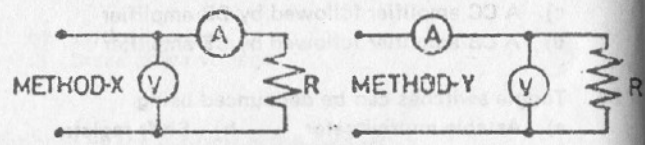
100. The correct relation between Alpha and Beta of a transistor is
a) $\alpha/\beta-1$ b) $\beta=\alpha-1$ c) $\beta=\alpha/1-\alpha$ d) $\alpha=\beta+1/\beta$

ELECTRONICS – VI

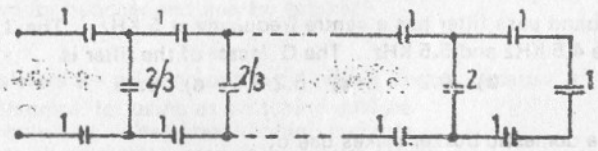
1. The professional printed circuit board generally use the following as the raw material :
   a) Paper base bakelite copper clad sheet
   b) Glass epoxy copper clad sheet
   c) Tin plated Nylon sheet
   d) Silver plated pyrex sheet

2. Many switch contacts use silver as the material because
   a) It is a good electrical conductor witn low contact resistance
   b) Silver does not tarnish
   c) It is easily shaped as per requirement
   d) It is very hard and does not wear off

3. A resistance of approx. value 85 Ω is to be measured by using an ammeter of range 0 – 1 A having a resistance of 20 Ω and a voltmeter of range 0 – 50 V having a resistance of 5000 Ω. Two arrangements for the measurement are shown in the figure below. Which method would you recommend ?
   a) Method X
   b) Method Y
   c) Either X or Y
   d) Neither X nor Y

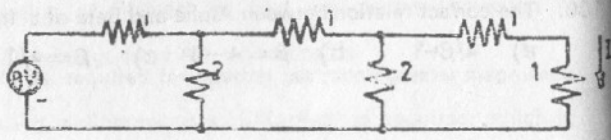


4. The value of capacitance across points A and B in the circuit shown below is (in microfarads)
   a) 3
   b) 1
   c) 0.67
   d) 0.33

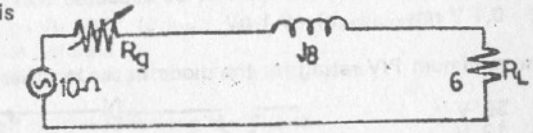


5. It is proposed to fabricate a simple Ohm meter for measuring resistor values. A milliammeter with an internal resistance of 50 Ω is available. Choosing a configuration using a 3V battery, a large resistance and the ammeter in a loop, the unknown resistor is proposed to be measured by noting the current initially and then connecting the unknown resistor across the ammeter. If the ratio of the two currents is 2, what is the value of the unknown resistor (rn Ω) ?
   a) 3000 b) 150 c) 100 d) 50

6. The current I flowing into the branch indicated by an arrow in the circuit shown is equal to
   a) 2 Amp.
   b) 0.5 Amp.
   c) 1 Amp.
   d) 0.25 Amp.



7. For the circuit shown, the maximum power is delivered to the load resistance R_L when the value of R_g is
   a) 2 Ohms
   b) Zero
   c) 10 Ohms
   d) Infinity



8. A signal generator is available in the laboratory, which is in good condition except for the attenuator dial which has got displaced. In order to calibrate this, a high frequency oscilloscope is available. At a particular setting of the knob an open-circuit voltage of 450 mV rms is measured. If the impedance of the generator is 50 Ohms, the setting of the attenuator dial is to be adjusted for
   a) 6 dBm b) 1 dBm c) 0 dBm d) 10 dBm

9. The relation $\text{Log}_e (x + \text{Log}_e (1 + x)) = 0$ also means that
   a) $X^2 + X + 1 = 0$ b) $X^2 + X - 1 = 0$
   c) $X^2 + X + e = 0$ d) $X^2 + X - e = 0$

10. The Laplace transform of the function $f(t) = \cos wt$ is
    a) $w/(s^2 + w^2)$ b) $s^2/(s^2 - w^2)$
    c) $w^2/(s^2 + w^2)$ d) $s/(s^2 + w^2)$

11. If a = b = c, one value of x which satisfies the equation

$$\begin{vmatrix} 0 & x-a & x-b \\ x+a & 0 & x-c \\ x+b & x+c & 0 \end{vmatrix} = 0 \text{ is given by}$$

    a) x = a b) x = b c) x = c d) x = 0

12. An LC oscillator is being analysed. If the LC tank circuit (with quality factor = Q) is isolated from the amplifying device, the impedance at the resonant frequency as measured looking into the amplifier will be
    a) $Q \times [LC]^{\frac{1}{2}}$ b) $\frac{1}{2} \times \pi \times [LC]^{\frac{1}{2}}$
    c) $-Q \times [L/C]^{\frac{1}{2}}$ d) $Q \times [L/C]^{\frac{1}{2}}$

13. A battery eliminator is required to be constructed and an assortment of rectifiers, resistors and capacitors is available. However, the step down transformer available has no center tap. The following configurations for the rectifier are feasible. The one giving the lowest ripple will be
    a) Full Wave rectifier b) Half wave rectified
    c) Bridge rectifier d) None of the above

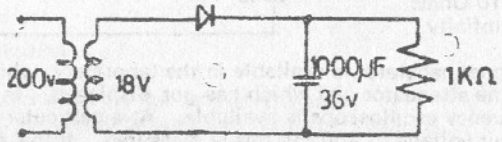
14. Chokes used in rectifier filter circuits are wound on a core with a small air gap. This is done in order to
    a) Get as high an inductance as possible
    b) Prevent saturation of the core
    c) Absorb the ripple effectively
    d) Prevent loading the transformer

15. An integrated circuit linear regulator is used at the output of a power supply having a ripple of 1 V rms. Assuming that the IC represents a typical design generally available, the output rms ripple to be expected will be

a) 0.1 V rms b) 0.1 uV c) 100 uV d) 1.0 V rms

16. The minimum PIV rating for the diode in the rectifier circuit shown should be

a) 36 V
b) 18 V
c) 26 V
q) 52 V



17. For VHF interfering waves generated by automobile ignition systems or other electrical equipment located close to the ground, specify which of the following components of the interfering signal are significant at receiving locations such as used ia the reception of TV signals :

a) Horizontal polarization component
b) Vertical polarization component
c) Both Horizontal and Vertical polarization components
b) Neither Horizontal nor Vertical polarization components

18. The ratio of lower frequency limit to the MUF for radio communioation at short-wave is generally

a) Smaller at night than in the day time
b) Larger at night than in the day time
c) Same at night and in the day time
d) A maximum during the evening times

19. Two UHF amateur radio antenna placed at the same height and 30 statute miles apart are to be such that each is on the radio horizon line of the other. The height of the antennas should be

a) 56.25 ft b) 112.5 ft c) 150 ft d) 225 ft

20. A transmitter with a radiated power of 1 KW produces a field strength of 300 mv/m at a distance of 1 Km from the antenna. If the transmitter power is increased to 50 KW and the vertical directivity of the antenna is increased by a factor of 1.41, the field strength a the same distance from the antenna is approximately

a) 1.5 V/m b) 2.115 V/m c) 3.0 V/m d) 6.0 V/m

21. The directive gains of non-resonant and resonant wire antennas of equal length are approximately in the ratio of

a) 4 : 1 b) 1.5 : 1 c) 1 : 1 d) 3 : 1

22. A simple wire radiator produces a radiation field of intensity 100 uV/m at a distant point 25 Km away. The fieldproduced (in uV/m) at a point 50 Km away in the same direction is

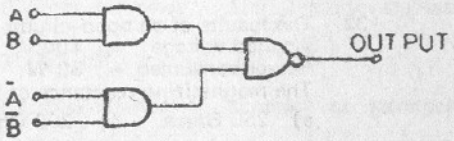
a) 25 b) 50 c) 12.5 d) 100

23. Assuming the plane of polarization of the incoming wave and the plane of the receiving antenna to be the same, the effective height of the receiving antenna is proportional to

a) Radiation resistance b) Power gain of the antenna
c) Physical area of the antenna
d) Wavelength, assuming other parameters being same

24. The function performed by the following circuits is

a) General combinatorial logic
b) Exclusive OR logic
c) Exclusive NOR logic
d) Digital comparator logic

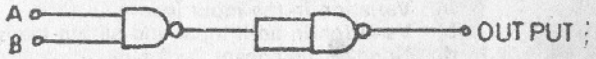


25. Narrow trigger pulses are required to be generated from a square wave pluse train (pulse width = T). The linear wave shaping circuit would be an RC circuit (time constant = T) with the following features :

a) High pass with T << T b) High pass with T >> T
c) Low pass with T >> T c) Low pass with T << T

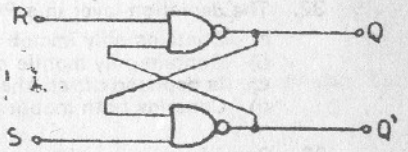
26. The circuit given below acts as

a) An OR gate
b) An AND gate
c) An Inverter
d) A NOR gate



27. In the circuit shown below. if R = 0 and S = 1,the outputs Q and Q' will be

a) Q low, Q' high
b) Both low
c) Q high, Q' low
d) Both high



28. Schmitt trigger buffers are normally used as input buffers to digital logic circuit to achieve

a) Higher isolation b) Higher fan-in capability
c) Higher drive capability d) Higher noise-immunity

29. For a reverse-biased PN junction. if the applied voltage is doubled the junction capacitance decreases by a factor of $2^{\frac{1}{2}}$. Assuming the junction acts as a parallel plate condenser, the average spacing between the plates changes by a factor of

a) 2^{2} b) 2 c) $\frac{1}{2}^{\frac{1}{2}}$ d) $2^{\frac{1}{2}}$

30. Many frequency sources use a piezo-electric resonator in the feedback circuit essentially to achieve a

a) Miniature product b) Low cost design
c) Stable frequency d) Large output power

31. A pulse train has the following characteristics :
Peak amplitude = 10 V, Pulse ON time 1 sec
Pulse OFF time = 4 sec

The pulse train is passed through a high pass RC filter with a large time const
The amplitude of the positive peak at the output will be
a) 10 V p) 2 V c) 4 V d) 8 V

32. The results of an open-circuit test on a single phase transformer are as follows
Applied voltage = 100 V, Current drawn = 0.5 Amp.
Power consumed = 30 W
The magnetizing reactance of the transformer is
a) 250 Ohms b) 200 Ohms c) 400 Ohms d) 500 Ohms

33. The principle of velocity modulation is NOT used in the following microw device :
a) Traveling wave tube b) Magnetron
c) Klystron d) Reflex klystron

34. The 'Pulling Figure' of a magnetorn is due to
a) Variation in the output load
b) Variation in the input load
b) Variation in both input and output loads
d) None of the above

32. The depletion layer in a P-N junction
a) Contains only immobile charges
b) Contain only mobile charge carriers
c) Is depleted off all charge carriers
d) Contains both mobile anb immobile charge carriers

36. Consider two bars of a semiconductor of identical dimensions one of which doped P-type and the N-type, with equal number of impurity atoms. T restistance of the P-type bar is
a) Equal to that of the N-type bar
b) Greater than that of the N-type bar
c) Lesser than that of the N-type bar
d) Not related to that of the N-type bar

37. If the base width of a Bipolar transistor is increased, then its current gain
a) Increases b) Decreases first and then increases
c) Remains constant d) Decreases

38. In an FET, the drain current beyond the pinch off point
a) Increases rapidly with increase in drain to source voltage
b) Reduces slowly with increase in drain to source voltage
c) Remains almost constant
d) Is zero

39. The key feature of CMOS inverter from the point of low power dissipation is that
a) One of the devices is cut-off in either logic state
b) It uses one each of MOS and NMOS devices
c) Silicon area required is low
d) Its high speed capability

40. At an ambient temperature of 25° C, the junction temperature of a transistor has reached 150° C while dissipating 100 Watts of power. The junction ambient thermal resistance of the transistor is
a) 1.25°/W b) 0.8°/W c) 1.5°/W d) 2.5°/W

41. For a transmission line with air dielectric, the attenuation constant at extremely high frequencies is
a) Directly proportional to the frequency
b) Inverely proportional to the frequency
c) Directly proportional to the square root of frequency
d) Inversely proportional to the square root of frequency

42. In a transmission line with characteristic impedance 50 Ω a resistive load of 25 Ω produces a VSWR of 2. The same VSWR will be produced if the resistive load is changed to
a) 75 Ω b) 100 Ω c) 1250 Ω d) 2500 Ω

43. A load resistance of 300 Ω is to be matched to a two wire transmission line of characteristic impedance 600 Ω using a quarter-wave line. The characteristic impedance of tne matching line should be
a) 424 Ω b) 300 Ω c) 450 Ω c) 900 Ω

44. An oscilloscope video amplifier is found to use a transistor in the common base configuration. The reason for this woule be
a) It has a very good high frequency response
b) It gives a higher input impedance
c) It is a very stable configuration
d) Ir consumes very low current

45. RF amplifiers are generally configured as class C tuned stages. The conduction angle is kept as low as possible consistent with output power because
a) It improves distortion b) Ir reduces oscillatory tendency.
c) It increases RF gain d) It improves efficiency

46. In a directional coupler having 30 dB coupling the RF power available at the coupled output is 10 mW. The power input to the directional coupler is
a) 100 mW b) 1 W c) 10 W d) 100 W

47. It is required to design a small instrumentation amplifier to improve the sensitivity of an available instrument. For stabilizing the gain under the operating conditions, negative voltage feedback of 10% is considered adequate. If the closed loop gain is required to be 5 (five), the open loop gain required for the amplifier will be
a) 0.5 b) 10 c) 5.5 d) 50

48. A video amplifier is required to be designed for amplifying signals from a T camera. The black to white transition can take place within 70 nanosec from 10 to 90% of the amplitude of the picture signal. The maximum bandwidth to b chosen for the vedio amplifier will be

a) 70 MHz b) 7 KHz c) 7 MHz d) 5 MHz

49. A microphone amplifier is available which is required to be used with a ne microphone of higher sensitivity. With a supply voltage of 12 V one of the clas A stages is found to be clipping at 6 V peak voltage. By changing the collecto load to a transformer coupled design instead of resistive, clipping would occur at

a) 3 V b) Same level as before c) 12 V d) 24 V

50. In order to get highter power output, two audio amplifiers working in class A ar proposed to be combined. There is also an alternate way to convert both stages to class B and then combine. If this alternative is adopted, the maximum audio power can be greater than the class A case by a factor of approximately

a) 12 b) 2 c) 4 d) 6

51. Cross-over distortion in audio amplifier is generally present in

a) Class B amplifiers b) Class A amplifiers
c) Class A amplifiers with negative feedback
d) Transformer coupled class A amplifiers

52. Negative feedback is applied to audio amplifiers to obtain stable gain. As a resul the distortion will

a) Be unaltered b) Increase
c) Decrease d) Disappear

53. Many instrument preamplifiers are transistor gain stages coupled directly without capacitors. This is done in roder to obtain

a) A good low frequency response b) A good impedance match
c) A high gain d) A low noise output

54. Class B push-pull operation gives an output signal with low distortion because

a) It operates in linear portion of V-I characteristic
b) Even harmonic components get canceled
c) There is inherent feedback to reduce distortion
d) Distortion components are automatically filtered out

55. Cross modulation in a receiver takes place in the

a) audio amplifier stage b) IF amplifier stage
c) RF amplifier stage d) Detector stage

56. Neutralizing circuits are used in tuned RF amplifiers to

a) Improve efficiency b) Develop more RF power
c) Prevent oscillations due to intetnal feedback
d) Obtain good thermal stability

57. It is required to construct a simple oscillator to test transducers in the audio frequency range. It is proposed to configure a Wein Bridge circuit for which required resistor and capacitors are available. An amplifier is required to be procured to complete the design. The voltage gain to be specified for the amplifier is

a) + 1 b) — 3 c) + 3 d) + 10

58. Amplitude modulation is essentially a process which translates the frequency spectrum. To achieve this

a) Time varying linear systems, e.g. switching or chopping circuits only can be employed.
b) Circuits using non-linear elements only can be used
c) Neither time varying linear nor non-linear circuit are required
d) Either time varying or non-linear circuits can be used

59. An envelope detector uses a parallel RC circuit to recover the message signal m (t) from an AM wave. If f_m is the maximum modulating frequency and f_r the cut-off frequency of of the RC circuit, the relationship between f_m and f_r is

a) $f_r = f_m$ b) $f_r > f_m$
c) f_r lies between f_m and f_c where f_c is the carrier frequency.
d) $f_r < f_m$

60. The bandwidth (in MHz) of a receiver to receive a QPSK modulated RF signal at a data rate of 1.5 MBps is

a) 2.5 b) 0.75 c) 3.0 d) 6.0

61. Coherent radars utilise for the transmitter oscillator a

a) Magnetorn b) Master oscillator and TWT amplifier
c) Klystron d) Reflex klystron

62. Interlace technique is used in TV for

a) Improving horizontal resolution b) Flicker reduction
c) Bandwidth reduction d) Improving vertical resolution

63. Night effect is caused by

a) Horizontally polarized waves traveling parallel to the ground
b) Vertically polarized waves traveling parallel to the ground
c) Vertically polarized down coming waves
d) Horizontally polarized down coming waves

64. VOR provides bearings with respect to

a) Magnetic north b) Heading of the aircraft
c) True north d) Line joining the VOR and the aircraft

65. In VHF FM communication systems, a high value of IF (viz. 10.7 MHz) is often used for obtaining
a) Better image rejection b) Better IF gain
c) Better Adjacent channel rejection d) Better sensitivity

66. An SSB system and a fully-modulated DSB system have the same peak power. The signal-to-noise power ratio of the SSB system is greater than the DSB system by a factor of
a) 2 b) 4 c) 16 d) 8

67. In PCM systems, for random type of noise at the Receiver input, the error performance exhibits a saturation effect with increasing S/N ratio. This threshold is approximately at
a) 26 dB b) 10 dB c) 17 dB d) 20 dB

68. In an FM system, for a given Transmitter power, the maximum range at which a usable signal can be received will be
a) Greater for a narrower bandwidth
b) Greater for a larger bandwidth
c) Independent of bandwidth
d) Dependent on actual noise level

69. The IF amplification per stage in an FM Receiver as compared to an AM receiver using the same amplifier devices is
a) Smaller b) Larger
c) Same d) Dependent on the value of the IF

70. A random experiment has 16 equally likely outcomes. The information associated with each outcome is
a) 16 bits b) 1 bit c) 2 bits d) 4 bits

71. The minimum bandwidth required to recive an FM modulated signal with a madulating frequency between 0.5MHz and 5.0 MHz and with a maximum deviation of 10 MHz is
a) 20 MHz b) 10.5 MHz c) 30 MHz d) 15.5 MHz

72. The total power in the two sidebands in a 100% modulated AM wave is
a) Half the total power in the modulated wave
b) One fourth the total power in the modulated wave
c) One third tne total power in the modulated wave
d) Independent of the carrier power

73. For a two-tone modulating signal, the PEP of an AM transmitter is
a) P_{avg} b) $P_{avg}/2$ c) $2 \times P_{avg}$ d) $4 \times P_{avg}$

74. The image frequency (in MHz) of a receiver with an IF of 21.4 MHz and RF input frequency of 434 MHz is
e) 455.4 b) 476.8 c) 414.6 e) 42.8

75. The noise figure of a receiver having a front end low noise amplifier of noise figure 2 dB followed by a Mixer of Noise figure 20 dB is
a) 4.1 dB b) 22 dB c) 3.2 dB d) 2.0 dB

76. Demodulation of a single-side band signal is done using
a) Ratio detector b) Product detector
c) Envelope detector d) Foster Seely circuit

77. In AM transmitters, such as used for police radios, for maintaining relatively high average percentage modulation irrespective of the speaker it is necessary to use
a) AGC b) Peak limiters c) Volume compressors d) AVC

78. In communication transmitters, use of saturated class C amplifiers after modulation
a) Removes incidental FM is AM systems
b) Is not desirable in FM systems
c) Is permissible in AM systems
d) Removes incidental AM in FM systems

79. Pre-emphasis is used to
a) To get better noise suppression at the low modulation frequencies
b) Maintain a constant modulation index for all modulating signals
c) Avoid signal being suppressed by large values of noise voltages
d) To improve S/N ratio at higher modulation frequencies

80. The selectivity of a Receiver is determined largely by the characteristics of the
a) AF stage b) Mixer stage c) RF stage d) IF stage

81. In a channel disturbed by white Gaussian noise, the channel capacity C in bits per second is given by

$$C = B \log_2 (1 + S/N)$$

where B s the channel bandwidth S is the signal power and N is the noise power.
If the channel bandwidth is made infinite, the channel capacity will
a) remain constant b) become infinite
c) reduce d) remain finite

82. The ON time in the drive voltage wavefrom for the horizontal deflection circuitry in a broadcast TV receiver is 16 microseconds. The duty ratio of this drive voltage is
a) 40% b) 25% c) 20% d) 75%

83. In the TV system adopted in India, the vision IF is
a) 44.4 MHz b) 38.9 MHz c) 33.4 MHz d) 27.9 MHz

84. In a TV system, diplexer is used for
   a) Using the same antenna for transmission and reception
   b) Combining the visual and aural signals into the same antenna
   c) Protecting the receiver from the high transmitter power
   d) Transmitting two programmes from the same transmitter

85. The amplitude of the sync pulse in a composite television signal with respect to blanking level is
   a) 0.3 V b) 1 V c) −0.3 V d) 4 V

86. The modulator stage in a high power broadcast transmitter uses the following type of amplification
   a) Class B b) Class A c) Class AB d) Class C

87. The brightness control in a conventional TV receiver controls
   a) Video amplitude b) Grid voltage of the CRT
   c) Frequency of the horizontal oscillator
   d) Anode voltage of the CRT

88. The charge coupled device is used in television for
   a) Camera b) Receiver c) Transmitter d) Networking

89. Some MTI radars distinguish between moving and stationary targets using the principle that return pulses from
   a) Stationary targets contain Doppler shift
   b) Stationary targets are stronger
   c) Moving targets fluctuate in phase
   d) Moving tragets have constant phase

90. In a pulsed radar operating at a frequency f Hz, with an interpulse period of 'T' seconds, the maximum unambiguous range is given by
   a) cT b) cT/2 c) f T d) f T/2

91. Angular error is extracted in a modern trabking radar using
   a) Cosecant square pattern the antenna
   b) Monopulse technique c) Helical scan
   d) None of the above

92. A radar display which maps the bearing and range on a polar display is called
   a) A-scope display b) PPI display
   c) B-scope display d) C-scope display

93. For a pulsed radar operating with a 1 microsec pulse width and prf of 1 KHz, the average power is 15 W. If the prf alone is changed to 2 KHz, the average power will be
   a) 7.5 W b) 15 W c) 30 W d) 3.75 W

94. Radar beacons are used for
   a) Ship navigation within horizon range
   b) Ship and aircraft navigation
   c) Aircraft navigation and homing of airborne cargo
   d) Transmitting distress signals

95. A parabolic antenna converts the energy from the feed located at the focus into a
   a) Plane wavefront without uniform phase
   b) Spherical wavefront
   c) Curved wavefront without uniform phase
   d) Plane wavefornt of uniform phase

96. A backward wave oscillator belongs to the family of
   a) Traveling wave tubes b) Cross field tubes
   c) Power grid tubes d) None of the above

97. The gain of a radar antenna is proportional to
   a) Aperture area/Wavelength b) Frequency/Aperture
   c) Aperture area/Square of the wavelength
   d) Square of the Aperture area/wavelength

98. In a rectangular waveguide of internal dimensions 12.5 mm × 25 mm, the cut off wavelength for the dominant mode will be
   a) 5 cm b) 2.5 cm c) 1.25 cm d) 3.75 cm

99. In a reflex klystron, electrons bunch around the electron entering tha cavity when the RF electric field at the gap is
   a) Zero and changing from accelerating to accelerating phase
   b) Zero and changing from accelerating to decelerating phase
   c) Maximum and in the accelerating phase
   d) Maximam and the decelerating or accelerating phase

100. The Doppler frequency shift is
   a) Dependent only on the radar frequency
   b) Depend ent on the target velocity
   c) Dependent both on the relative radial velocity of the target and the radar frequency
   d) In dependent of the radar frequency

ELECTRONICS – VII

1. The wave of frequency 150 MHz is propagated in space; then the propagation constant will be approximately (assume the velocity is 3×10^8 m/sec)
   a) j3.1416 b) j6.2832 b) 3.1416 d) 6.2832

2. The resonant frequency of a series resonant circuit is 30 KHz at Q factor = $\sqrt{2}$, and the circuit is changed to parallel tuned circuit, then the resonant ftequency will be approximately
   a) 41.213 KHz b) 31.213 KHz
   c) 21.213 KHz d) 11.213 KHz

3. The inductive reactance of a parallel tuned circuit if Q factor is 2 and the capacitive reactance = 100 ohms will be
   a) 25 ohms b) 50 ohms c) 75 ohms d) 100 ohms

4. The phase angle between voltage and current in a Resonant circuit will be
   a) 45 deg b) 90 deg c) 0 deg d) 22.5 deg

5. Resonant Resistance in ohms of a parallel tuned circuit if L = 100 mH, C = 100 uF and R = 10 ohms will be
   a) 1000 b) 500 c) 250 d) 100

6. The source and load impedence of a network system is R1 + jx1 and R2 + jX2. The maximum power is transferred to load if and only if
   a) R1 = -R2 & X1 = X2 b) R1 = R2 & X1 = X2
   c) R1 = R2 & X1 = -X2 d) R1 = -R2 & X1 = -X2

7. The Laplace transform of K $\int$ dt is
   a) $Ks^2/2$ b) K/s c) $2K/s^2$ d) Ks

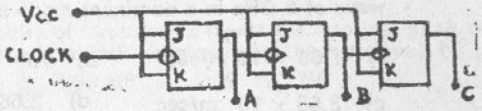
8. The Laplace transform of an exponential function [(exp(-at)]
   a) s-a b) s+a c) 1/s+a d) 1/s-a

9. The value of m in high pass m – derived filter is given in terms of its 3 db point fc and cut off frequency f_∞ as
   a) $\sqrt{1+(f_\infty/fc)^2}$ b) $\sqrt{1-(f_\infty/fc)^2}$
   c) $\sqrt{1+(fc/f_\infty)^2}$ d) $\sqrt{1-(fc/foo)^2}$

10. The cut-off frequency fc of a low pass T Section filter whose series arm components are inductance L/2 and capacitance C/2 is
    a) $1/2\pi\sqrt{LC}$ b) $1/\pi\sqrt{LC}$ c) $2/\pi\sqrt{LC}$ d) $1/\sqrt{LC}$

11. The power delivered to a load through a transmission line whose standing wave ratio is 2 and the power input is 90W
    a) 90 W b) 80 W b) 70 W d) 60 W

12. The cascaded flip-flop shown is a
    a) Ripple counter
    b) Synchronous counter
    c) All the above
    d) Synchronous counter with clock input



13. The velocity error constant of a servo is the product of the
    a) Gain of the amplifier and motor constant
    b) Gain of the amplifier and difference between input/output
    c) Motor constant and difference between input/output
    d) Time constant and difference between input/output

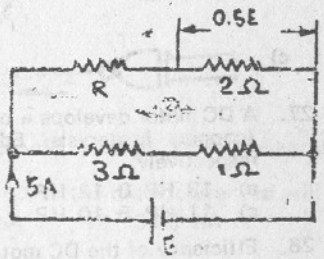
14. Tachometer is introduced in servo system to
    a) increase the velocity error constant
    b) increase the motor time constant
    c) increase the error for a constant velocity input
    d) increase the error for a step idput

15. Analogy for the Electrical parameters charge and inductance to mechanical parameter are respectively
    a) displacement and friction
    b) displacement and compliance
    c) displacement and mass
    d) current and velocity

16. The true statement for the Electro-mechanical analogy is
    a) Inductance to mass and compliance to capacitance
    b) Friction to resistance and charge to displacement
    c) Velocity to current and Torque to power
    d) All the above

17. Identify from the following, the servo components
    a) Amplifier b) Synchros and DC motors
    c) Tachometers and Resolvers d) All the above

18. Find the Battery voltage and the value of R of the circuit given below
    a) 0.5 V & 2 ohms b) 5V & 4 ohms
    c) 10V & 2 ohms d) 45 V & 4 ohms



19. Parabolic reflector of dia. 2m used at 6 GHz has the gain of
    a) 4800 b) 9600 c) 12000 d) 14400

20. Group velocity in a parallel plane wave guide separated by a distance of 3 cm for wave of 6 GHz in a dominant mode is

a) 1.66×10^{8} m/sec b) 1.66×10^{10} m/sec
c) 3.66×10^{8} m/sec d) 2.66×10^{8} m/sec

21. The characteristic impedance of a parallel plane waveguide in a dominant mode, 6 GHz and separated by 3 cm is

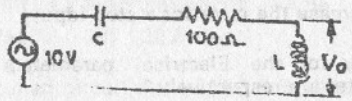
a) 65 ohms b) 682 ohms c) 6.8 ohms d) 782 nnms

22. Cut off wave length of a circular wave guide whose internal diameter is 4 cm for 10 GHz signal propagated in TE11 mode where [kr] shown from a Bessel function equation is 1.84

a) 5.93 cm b) 6.83 cm c) 3.83 cm d) 8.83 cm

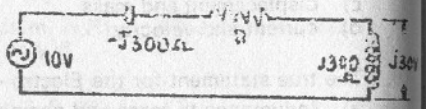
23. The voltage Vo across the inductance and the inductive reactance of a series resonant circuit having Q = 2 is

a) j10V, j300 ohms
b) j0V, j100 ohms
c) j20V, j200 ohms
d) j5V, j50 ohms



24. The Q factor and the value of R of a series resonant circut shown below is

a) 3 & 200 ohms
b) 3 & 100 ohms
c) 3 & 400 ohms
d) 15 & 300 ohms

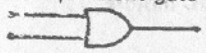


25. The simplified Boolean expression of the function indicated below in the Karnaugh map is

a) $\bar{A}$D b) $\bar{A}$B c) $\bar{B}$D d) $\bar{B}$D

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	0	0	0	0
$\bar{A}B$	1	0	0	1
AB	1	0	0	1
$A\bar{B}$	0	0	0	0

26. The equivalent gate of the gate shown

a)  b)

c) d)

27. A DC motor develops a back emf of 200V and draw 37.3A of current the total loss (copper, hysterysis, Eddy current) is 746 watts. Then, the BHP & IHP are respectively.

a) 13 HP & 12 HP b) 12 HP & 11 HP
c) 11 HP & 10 HP d) 10 HP & 11 HP

28. Efficiency of the DC motor whose,IHP &BHP are respectively 22 HP & 20 HPthe total loss of 746 watts is approximately

a) 98.91% b) 96.91% c) 92.91% d) 90.91%

29. A load of 1000 lbs is applied to a pully of diameter 2 ft attached to the shaft of a DC motor running at $19800/2\pi$ rpm. The BHP developed by the motor will be

a) 400 HP b) 500 HP c) 600 HP c) 700 HP

30. The loss components of a transformer are

a] Copper, Hysteresis & Eddy current
b] Copper, Hystersis & Rotational loss
c] Copper, Rotational and Eddy current
d] Rotational, Copper and Hysteresis

31. A DC motor draws 74.6 A and develops a back emf of 200V at $16500/\pi$ rpm. Then the torque developed by the motor will be

a) 2.77 Kgm b) 3.77 Kgm c) 4.77 Kgm d) 5.77 Kgm

32. The difference equation y (n) – a y(n–1) = o is called

a) non-homogeneous b) homogeneous
c) non-linear d) none of the above

33. The difference equation y(n)—ay (n–1) = X (n)

a) does uniquely specify the input
b) does uniquely specify the output
c) does uniquely specify the input and output relation
d) does not uniquely specify the input and output relation

34. A system of a linear constant co-efficient difference equation will be a linear shift invariant system only if we choose the following equation. (where y(n) & X (n) are output and input respectively)

a) y(n) – ay(n–1) = X(n) b) y(n) – ay(n) = 0
c) y(n) – ay(n–1) = b d) none of the above

35. The solution to the first order diffenence quation y(n) = ay(n–1) + x (n) f X(n) is unit sample, u(n) unit step with the all initial conditions zero is

a) $y(n) = \sum_{n=0}^{\infty} a^{n} u(n)$ b) $y(n) = \sum_{n=0}^{\infty} u(n)/a^{n}$

c) $y(n) = \sum_{n=0}^{\infty} a^{n-1} u(n)$ d) $y(n) = \sum_{n=0}^{\infty} u(n-1)/a^{n}$

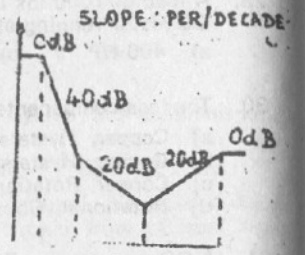
36. For an N channel enhancement MOSFET with threshold voltage Vt= 2.5V and the property of the device constructian
K = 3 ma/V2 and the gate source voltage VGS = 4.0V, the drain current Id will be

a) 0.075 mA b) 3.75 mA c) 6.75 mA d) 9.75 mA

37. A depletion MOSFET has Drain source saturation current IDSS = 12 mA, pinch off voltage Vp =– 4.5V The drain current at gate source voltage Vgs=–3V is

a) 12.9 mA b) 1.33 mA c) 2.66 mA d) 12.33 mA

38. The transfer function of the control system whose Bode plot is given below



a) $[(s+2)^2 (s+12)] / [(s+5) (s+9)^2$

b) $[(s+5) (s+9)^2] / [(s+2)^2 (s+12)]$

c) $[(s+5) (s+2)^2] / [(s+9) (s+12)]$

d) $[(s+2)^2 (s+9)^2] / [(s+5) (s+12)]$

39. The conversion of discrete signal into continuous signal the zero order hol represented by gho = u(t) – u(t – T), Where u(t) is step function the transfer function of Gho (s) interms of Laplace transform variable s is

a) 1 –s b) (1 – sT)

c) $1 - (s / e^{-Ts})$ d) $(1 - e^{-Ts})/s$

40. Boxcar generator is considered as
a) First order hold circuit
b) Zero order hold circuit
c] Second order hold circuit
d) All the above

41. The value K of a stable closed loop control system characteristic equatio $s^3 + 3Ks^2 + [K + 2]s + 4 = 0$ is

a) > –2.528 b) > –0.528 c) > 2.528 d) > 0.528

42. The roots of the characteristic equation of the control system transfer function is called
a) Poles b) eigen values
c) Poles or eigen values d) Zeros or eigen vaiues

43. The radio receiver is tuned to 650 KHz but the radio station at 1560 KHz is heard quite clearly because
a) The detector is mal functioning
b) AF amplifier is mal functioning
c) IF amptifier is mal functioning
d) Image rejection circuit failure

44. In decimation in–time method of implementing FFT the bit reversal occurs at
a) Input side b) Output side
c) Between input and output d) Both input and output

45. The matrix $A = -A^T$ is true if the Matrix A rs
a) Symmetric b) Skew Symmetric
c) Anti–Symmetric d) Pro–Symmetric

46. Matrix $A = A^T$ is true if matrix A is
a) Symmetric b) Diagonal
c) Identity d) All the above

47. The determinant

$$\begin{vmatrix} 4 & 6 & 2 \\ 3 & 2 & 1 \\ 5 & 3 & 2 \end{vmatrix}$$ is equal

a) 1 b) 17 c) 0 d) 23

48. The inverse of the matrix $\begin{bmatrix} 7 & 4 \\ 3 & 2 \end{bmatrix}$

a) $\begin{bmatrix} 1 & -2 \\ -1.5 & 3.5 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 1.5 \\ -2 & -3.5 \end{bmatrix}$

c) $\begin{bmatrix} 1 & 3.5 \\ -2 & -1.5 \end{bmatrix}$ d) None of the above

49. If a square matrix A is said to singular if the determinant of A is
a) 0 b) 1 c) > 0 d) <0

50. The matrix A $\begin{bmatrix} 7 & 4 \\ 3 & 2 \end{bmatrix}$ and its adjoint matrix A is

a) $\begin{bmatrix} 2 & -4 \\ -3 & 7 \end{bmatrix}$ b) $\begin{bmatrix} 7 & -4 \\ -3 & 2 \end{bmatrix}$

c) $\begin{bmatrix} -2 & 4 \\ -3 & 7 \end{bmatrix}$ d) $\begin{bmatrix} 7 & -4 \\ -3 & 2 \end{bmatrix}$

51. If A and B are square and non–sigular matrix then $(AB)^{-1}$ is

a) $A^{-1} B^{-1}$ b) A^{-1} / B^{-1}

c) $B^{-1} A^{-1}$ d) B^{-1} / A^{-1}

52. The energy stored in an inductor is

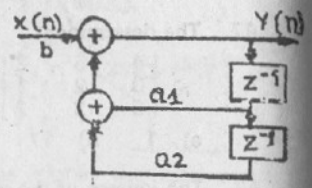
a) LI^2 b) $1/2\, LI^2$

c) $2LI^2$ d) $(L/I)^2$

53. Fast Fourier transform is an efficient algorithm for Digital implementation of discrete fourier transform (DFT). For 256 point DFT the computation time saved in multiplication and additions over direct method is
a) 256 b) 128 c) 0.256 d) 512 time

54. In decimation in frequency method of implementing FFT, the bit reversal occurs at
a) input data b) output data
s) output and input data d) All the above

55. The digital network shown below is given by difference euation where Z is the Z transform variable



a) Y(n) = a1 y (n+1) + a2y (n + 1) +bx (n)
b) Y(n) = a1 y (n–1) + a2y (n – 2) +bx (n)
c) Y(n) = a1 y (n) + a2y (n) + bx (n)
d) Y(n-2) = a1 y(n) + a2y(n) + bx (n – 2)

56. White noise have
a) Uniform noise spectrum over lowfrequency only
b) Uniform noise spectrum over high frequency only
c) Uniform noise spectrum over all the frequency range
d) Uniform noise spectrum over band limited frequency only

57. Fourier transform of an impulse is of
a) Uniform spectrum over all the frequency range
b) Uniform spectrum over the low frequency range
c) Uniform spectrum over the high frequency range
d) Uniform spectrvm over the band limited range

58. Limit cycle behaviour of the digital filter occurs due to
a) negative feed back b) positive feed back
c) truncation or rounding off d) over flow

59. The Log power of fourierspectrum transform is called
a) Spectrum b) Power spectrum
b) Cepstrum d) Complex spectrum

60. The minimum phase sequence [signal] in which the poles or zeros are always
a) inside the unit circle b) outside the unit circle
c) on the unit circle d) none of the above

61. In a Type– 2 servo system the contants Kp for position error, Kv for velocity error, Ka for acceleration error respectively are
a) ∞ ∞ Ka b) Kp ∞ ∞
c) Kp Kv Ka d] Kp 0 0

62. In Type– 1 servo system, R is the input and Kv is the velocity error constant, then the error for step, ramp, and parabolic inputs is
a) 0 R/Kv ∞ b) 0 R/Kv 0
c) ∞ R/Kv 0 d) R/Kv 0 0 respectively

63. The dominant poles of a control system transfer function have dominont effect on the
a) steady state response b) transient response
c) pole roots d) eigen values

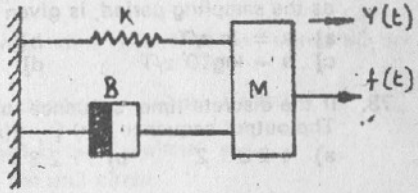
64. More closer the poles to the imaginary axis in the left half of the S–plane, gives rise to transient response that will
a) decay fast b) decay slowly
c) remains same d) oscillates

65. As the poles moves away from the imaginary axis in the left half of the S–plane, the maximum error
a) increases b) unaltered c) decreases d) ambiguous

66. The maximum time [in msec] at which the maximum overshoot occurs in a second order system whose natural frequency is 10 Hz and the damping rotio is 0.6
a) 62.5 b) 25.5 c) 31.25 d) 32.5

67. A tunnel diode
a) has a tiny hole in its centre to facitate tunneling
b) is a pin contact diode with a high reverse resistance
c) uses high doping level to provide e narrow junction
d) any of the above

68. The force equation f[t] of the mass, spring, and friction of the mechanical system shown is given by



a) $M\, d^2 y[t]/dt^2 + B\, dy[t]/dt + K\, y[t]$
b) $M\, d^2 y[t]/dt^2 + B\, y[t] + K\, d^2 y[t]/dt^2$
c) $M\, dy[t]/dt + B\, y[t] + K\, d^2 y[t]/dt^2$
d) any of the above

69. The diode current $I = Is\,[e^{KV/Tk} - 1]$ where Is is reverse saturation current, Tk, absolute degree kelvin, V is the applied voltage, K = 11600/n. The value of n for Ge & Si are
a) 1 & 2 b) 2 & 3 c) 3 & 4 d) 4 & 5

70. If the gate source voltage is increased beyond the pinch of voltage of JFET, then the
a) Id = 0, Ig = 0 b) Id = 0, Ig = max.
c) Id = max., Ig = 0 d) Id = max., Ig = max.

71. If 48 ev of energy is required to move the charge through a potential difference of 12V, then the charge in coulomb is
a) $9.1*10^{-19}$ b) $16.2*10^{-19}$
c) $6.4*10^{-19}$ d) $7.75*10^{-19}$

72. Transconductance of JFET [in umhos], if Idss = 12mA, Vp=-4V [pinch of voltage], Vgs = -1.5V [gate source voltage]
a] 4750 b] 3750 c] 7000 d] 1200

73. A system is causal if and only if
a] input never precedes output b] unrealisable
c] output never precedes input d] unstable

74. The system is stable only if
a] the bounded input gives an unbounded output
b] the bounded input gives a bounded output
c] an unbounded input gives a bounded output
d] an unbounded input gives an unbounded output

75. Jury's creterion is directly used to test the stability of
a] the discrete system b] the continuous system
c] hybrid system d] all the above systems

76. Fourier transform of convolutian of two timeseries X[t]*y[t]
a] X[w]/Y[w] b] X[w]-Y[w] c] X[w]+Y[w] d] X[w]*Y[w]

77. The relation between Laplace transform variable s and the Z-transform variable z, T as the sampling period, is given by
a] s = ln z/T b] s = T*ln z
c] s = log10 z/T d] s = T*log10 z

78. If the discrete time sequence u[n] = 1 & h(n) = 1 for 0<n<2, n is an integer. The output sequence y(n) [= u(n)*h(n)] is
a) 1 2 3 1 2 b) 1 2 3 4 1 c) 1 2 3 2 1 d) 3 2 1 2 3

79. The powerfull method of determining the stability of linear and nod-linear system with continuous data is the
a] Routh-Hurwitz method b] E. I. Jury's method
c] Liapunov's 1st. method d[Liapunov's 2nd. method

80. Fourier transform of a Auto-correlation fuction gives the
a] RMS value of the signal b] DC value of the signal
c] Power spectrum of the signal d] all the above

81. Z- transform is used to analyse the
a] continuous time system b] discreie time system
c] linear continuous time system d] none of the above

82. The digital signal is the one which is
a) continuous in time &discrete in amplitude
b) discrete in time & continuous in amplitude
c) discrete in both time and amplitude
d) continuous in both time and amplitude

83. The discrete system having transfer function
1/(z+1 - j1.4) (z+1+j1.4) is
a) stable b) unstable c) oscillatory d) none

84. The continuous system having transfer function
1/(s+3.5+j2.9) (s+3.5-j2.9) is
a) stable b) unstable c) oscillatory d) none

85. Wiener filter and Kalman filter employ respectively
a) methods of coventional transform & modern state space
b) methods of modern state space & conventional transform
c) methods of Hilbert transform & Laplace transform
d) methods of Homomorphic & Spectral factorisation

86. Wiener -Hopf integral equation can be solved by methods of
a) Hilbert transform b) Laplace transform
c) Spectral factorisation d) Z-transform

87. The Fourier transform of the product of two time function is
a) complex multiplication of individual Fourier transform of the two time functions
b) complex covolution of individual Fourier transform of the two time function
c) all the above d) none of the above

88. Gibbs phenomena occurs when an infinite time sequence is truncated by window called
a) Hanning b) Hamming c) Rectangular d) Barlett

89. Points in the left half of the S-plane is mapped in the Z - plane
a) on the unit circle b) inside the unit circle
c) outside the unit circle d) on the real axis

90. The gain of the first stage and the second stage of the two stage amplifier is 10 and 20 and the total input resistance is 2200 Ohms and 30200 Ohms and the output resistance is 100000 Ohms, then the equivalent input noise resistance is
a) 2590 b) 2518 c) 2578 d) 2900

91. The noise figure of a receiver connected to an antenna whose resistance is 50 Ohms, an equivalent resistance of 30 Ohm is
a) 4.6 b) 3.6 c) 2.6 d) 1.6

92. Equivalent noise temperature of a receiver with a noise figure of 1.7 under ambient temperature of 27 degree C is
a) 190° K b) 200° K c) 210° K d) 220° K

93. In an FM system, the audio signal 2.4 sin 1000TTt prodeces a deviation of 4800. If an audio signal of 7.2 sin 1000TTt is used, then the deviation will be
a) 10400 Hz b) 12400 Hz c) 11200 Hz d) 14400 Hz

94. In an FM system, the audio signal 2.4 sin 1000TTt produces a deviation of 4800 Hz, then the modulation index is
a) 9.6 b) 10.6 c) 8.6 d) 17.6

95. The signal propagated in a wave guide has its group velocity $1.66*10^8$ m/sec & the velocity of light is $3*10^8$ m/sec. then the phase velocity in m/sec. is
a) $5.43*10^8$ b) $7.49*10^8$
c) $1.66*10^8$ d) $3.0*10^8$

96. Pairs, quads, and octets used in Karnaugh map for simplification of Boolean function eleminates variables respectively
a) 1, 2, 3 b) 2, 3, 4 c) 3, 4. 5 d) 4, 5, 6

97. Z plane maps the points on the imaginary axis of the S plane
a) inside the unit circle b) outside the unit circle
c) on the unit circle d) on the real axis

98. Fourier transform can be evaluated from the Z plane points
a) on the unit circle b) inside the unit circle
c) outside the unit circle d) on the real axis

99. Routh-Hurwitz creterion is to test directly the etability
a) oi the continuous system b) of the discrete system
c) of the hybrid system d) of any of the above

100. The discrete system having the transfer function
1/ (z + 0.5 + j0.9) (z + 0.5 – j0.9) is
a) Stable b) Unstable c) Oscillatory d) none of above

ELECTRONICS – VIII

1. Teflon is very commonly used as a dielectric in microwave applications because it
a) Has a very large capacitance per unit volume
b) Has a very low dielectric loss
c) Can adhere to metals very easily
d) Is available in various sizes and shapes

2. Gallium Arsenide is a material which has recently found application in electronics, it is generally used as
a) A dopant for high frequency transistors
b) A low loss material used for packaging
c) A lead material in Impatt diodes
d) A base material for high frequency and high speed ICs

3. Many RF power transistors use Beryllium in the packages because
a) It is very cheap
b) It can be cast into required shapes
c) Fine leads can be bonded on the material
d) It is a low loss material with good thermal conductivity

4. The third term of a geometric progression is 4. The product of the first five terms is
a) 4^5 b) 4^3 c) 4^4 d) 20

5. The area of the circle centered at point (1, 2) and passing through point (4, 6) is
a) 5π b) 25π c) 10π d) None of these

6. Let Y = | X | Then at x = 0
a) dy/dx does not exist b) dy/dx = 1
c) dy/dx = –1 d) None of these

7. The transconductance of an FET is the ratio of
a) Drain current to the Gate voltage
b) Drain current to the Drain voltage
c) Gate current to the Drain voltage
d) Drain voltage to the Gate voltage

8. The short circuit current gain of a transistor is proportional to
a) Doping level in collector b) Doping level in Base
c) Doping level in emitter d) Base width

9. The transition frequency (f_T) of a transistor increases with decrease in
a) Leakage current b) Base width
c) Emitter efficiency d) Doping level in collector

10. The dynamic resistance (in ohms) of a PN junction diode at room temperature when a forward current of 5 mA flows through it is
a) 50 b) 0.05 c) 5 d) 500

11. When driving a bipolar switching transistor from saturation to cur-off, the time required to move the stored charge in the base region is called
    a) Stroage time b) Reverse recovery time
    c) Rise time d) Transition time

12. The main feature of Hot Carrier Diodes is tha they
    a) withstand lightning discharges
    b) withstand higher temperatures
    c) have a square law characteristic
    d) have a highly linear characteristic

13. In a PN junction drode, if the junction current is zero, this means that
    a) there are no carriers crossing the junction
    b) the potential barrier has disappeared
    c) the number of majority carriers crossing the junction equals the number of minority carriers crossing the junction
    d) the number of holes diffusing from the P-region equals the number of electrons diffusing from the N-region

14. The resistance of a strip of copper of rectangular cross section is 2 ohms. A metal of resistivity twice that of copper is coated on its upper surface to a thickness equal to that of the copper strip. The resistance of the composite strip is (in Ohms)
    a) 3/2 b) 6 c) 4/3 d) 3/4

15. A 3-phase step down transformer is connected to 6.6 KV mains and draws 10 Amps. Foa which of the following connections will the secondary line current be the least ?
    a) Star – Delta b) Star – Star
    c) Delta – Delta d) Delta – Star

16. The magnetic core used in a high frequency switching transformer is
    a) Ferrite core b) Steel laminated core
    c) Air core d) Dust iron core

17. A higher efficiency and higher order multiplier could be obtained by using
    a) Step recovery diode b) Varactor diode
    c) Ga-As transistor in common base mode d) PIN doide

18. Two parallel beams of electrons moving in the same direction will
    a) Repel each other b) Attract each other
    c) Neither attract nor repel each other
    d) be deflected perpendicular to the plane of the two beams

19. A load $Z_L = R_L + jX_L$ is to be matched using an ideal transformer to a generator of internal impedance $Z_S = R_S + JX_S$. The transformer turns ratio should be
    a) $(R_L / R_S)^{\frac{1}{2}}$ b) $\{R_L / |Z_S\}^{\frac{1}{2}}$
    c) $\{|Z_L| / |Z_S|\}^{\frac{1}{2}}$ d) $\{|Z_L| / R_S\}^{\frac{1}{2}}$

20. A 10 microfarad capacitor is initially at 0 Volt. It is charged by a 1 mA current source for 1 second, and discharged by a 2 mA current sink for 1/4 second. The voltage on the capacitor will be (in Volts)
    a) 0 b) 25 c) 50 d) 100

21. The resultant rise time when to amplifiers of rise times t_{r1} and t_{r2} respectively are cascaded is
    a) $t_{r1} + t_{r2}$ b) $|t_{r1} - t_{r2}|$
    c) $|t_{r1}^2 - t_{r2}^2|^{\frac{1}{2}}$ d) $(t_{r1}^2 + t_{r2}^2)^{\frac{1}{2}}$

22. Emitter coupled logic (ECL) is faster than TTL and COMS logic circuits because
    a) Bipolar transiators are used
    b) Low voltage swings
    c) Transistors operate in unsaturated mode
    d) Constant current source biasing is used

23. A black box containing various active and passive elements is required to be modeled as a gain and delay device by actual measurements at 10 KHz. On imposing a sinusoidal signal of 1 mV peak (at 10 KHz) at the input, the output wavefrom is observed to be 6.25 mV peak on an oscilloscope and is found to be in advance of the input weveform by 36°. The black box device has therefore a voltage gain of A (in dB) and delay of B (in usec), where A and B are given below :

	A	B			
a)	16	36	b)	6.25	36000
c)	12	10	d)	16	10

24. A condenser X of capacity C is charged to a potential V. Y is another condenser having capacity half that of X and charged to twice the potential of that of X. When they are connected together, the loss of energy is
    a) $CV^2/6$ b) $CV^2/2$ c) $CV^2/4$ d) $C^2/8$

25. An ideal binary 1010.. NRZ signal is passed through a high pass filter. The time constant of the filter is comparable to the bit duration. The waveform of the filter will
    a) Be a square wave
    b) Have instantaneous rise and fall times with DC levels showing a ramp
    c) Be a triangular wave
    d) Show a rise and fall time with no change in DC values

26. The decimal equivalent of ternary (base 3) number 120 is
    a) 20 b) 12 c) 15 d) 40

27. A 16 line to 1 line digital data multiplexer is located in building 'A'. A similar demultiplexer is located in building 'B'. The multiplexer/demultiplexer controls are located in building 'A'. The cable running from building 'A' to building 'B' will contain
    a) 1 wire b) 5 wires c) 4 wires d) 16 wires

28. A sample direct on-line switching regulator is to be designed for operating a computer peripheral equipment. A coarse DC of 50 V is available. Assuming that all the components are loss less, the switching transistor acts like an ideal switch, and the oatput voltage is 5 V at the frequency of operation, the on-time of the transistor will be (in usecs)

a) 10 b) 1 c) 50 d) 100

29. One of the advantages of using a field effect transistor over a bipolar type for a switched mode power supply is

a) It generates well regulated DC
b) There is no thermal
c) Ripple noise is low
d) We can avoid a rectifier

30. In a 3 phase full wave bridge rectifier circuit, the fundamental ripple frepuency is X times the line frequency, where X is equal to

a) 2 b) 6 c) 3 d) 1

31. The directive gain of a resonant wire eight wavelengths long is greater than the directive gain of a half-wave resonant antenna by

a) 8 b) 2 c) 4 d) 1

32. The capture area of a receiving antenna is proportional to

a) Square of the wavelength
b) Wavelength
c) Square root of the wavelength
d) Inverse of the wavelength

33. For ground wave communication, the desired antenna polarization is

a) Horizontal b) Elliptical c) Vertical d) Circular

34. Top loading of HF antennas at low frequencies is used to obtain

a) better antenna stability
b) increased antenna currents
c) higher Q of antenna
d) wide band matching

35. For Duct Propagation, state which of the following statements is WRONG :

a) Cutoff wavelength (as in the case of waveguides) does not exist
b) Dispersion effect is almost absent
c) Transmitting antenna should be within the duct
d) Duct propagation is more common over ocean than over land

36. Long distance TV reception is possible due to the

a) E layer b) F_1 layer c) Sporadic E layer d) Sporadic F_2 layer

37. What is the radio horizon distance (in miles) for an antenna with a height of 200 ft. under standard atmospheric conditions (K = 1.33) ?

a) 20 b) 26.6 c) 150 d) 53.2

38. The VSWR of an antenna is measured by measuring the forward and reflected powers. In a particular case, the measured values are 9 W and 1 W for the forward and reflected powers. The VSWR is then equal to

a) 2 : 1 b) 9 : 1 c] 3 : 1 d) $\sqrt{3}$: 1

39. It is required to feed RF signals simultaneously from two signal genarators to a receiver for certain measurements. The output impedance of the signal generators as also the input impedance of the receiver are 50 ohms each. The standard network used for the purpose is shown below. The value of R [in Ohms] should be

a) 50 b) 25 c) 16,6 d) 100

40 If magnitude of voltage and current is the same in all the following cases, the power consumption will be maximum when the voltage and current are out of phase by

a) 30° b) 15° c) 45° d) 90°

41. For a transmission line with solid dielectric, the antenuation constant at extremely high frequencies is

a) Inversely proportional to the frequency
b) Directly proportional to the square root of frequency
c) Directly proportional to the frequency
d) Inversely proportional to the square root of frequency

42. For a coaxial cable with D = inner diameter of the outer conductor and d = outer diameter of inner conductor, the characteristic impedance is proportional to

a) d/D b) D/d c) Log(D/d) d) Log (d/D)

43. A short-circuited lossy line is used to terminate a transmission line. if the attenuation of the lossy line is 20 dB, the SWR on the terminated line is

a) 1.02 b) 1.1 c) 1.2 d) 1.4

44. An electronic siren is designed as a tone-oscillator and power amplifier combination. The power amplifier uses two transistors in push-pull each dissipating 100W. For reliable operation. the junction temperature of the transistors is to be kept at 100°C. Each device has a thermal resistance from junction to case of 0.2°C/W. The maximum ambient temperature is expected to be 50°C. If a heat sink isto be used, its thermal resistanee (in ° C/W) from case to ambient (for both transistors together)

a) 2 b) 10 c) 0.4 d) 0.15

45. A tuned transistor power amplifier working from 1 to 10V supply is required to develop a power of 10 W into a 50 ohm load. The impedance transformation ratio required between the transistor output and the load is

a) 115 b) 2.25 c) 6.94 d) 10

46. Class A or AB operation of amplifiers is preferred mainly because of better

a) Power output
b) Efficiency
c) Linearity
d) Spurious reduction

47. It is proposed to design a low cost hearing aid for slightly hearing impaired persons. A carbon microphone element is used. The hearing aid transducer load to be used has an impedance of 1 to 2 k Ohms. If a bipolar transistor of low gain is to be used, what configuration would you recommend for the amplifier in order to get optimum performance ?

a) CC b) CB c) CE d) More than one stage

48. The maximum output from a complementary symmetry audio power amplifier operating in Class B mode with a 6 V battery into a 4 Ohm loud speaker is

a) 9/8 W b) 9/2 W c) 9/4 W d) 9 W

49. A class C amplifier can be used for RF amplification only and not for audio amplification because

a) High efficiency is reqoired at RF
b) Low frequency transistors cannot operate in class C
c) RF transistor can only be operated in Class C
d) Class C results in high distortion and hence cannot be used for audio amplification

50. It is required to measure the rms value of a sinusoidal voltage. The only available meter uses a peak detector, but is calibrated to indicate the rms value of a pulse with a duty cycle of 1 : 10. What correction factor would you use for the meter indication to indicate the the correct rms value of sinusoidal voltage ?

a) $10\sqrt{2}$ b) 1.41 c) 7.07 d) $\sqrt{2}/10$

51. An amplifier having 2 dB noise figure and 10 dB gain is followed by a mixer of noise figure 10 dB. The overall noise figure is (in dB)

a) 4 b) 2 c) 3 d) 12

52. The frequency stability of a crystal oscillator is high compared to that of an LC oscillator because

a) Q of a crystal is very low
b) Q of a crystal is very high
c) L and C vary with temperature
d) L and C vary with time

53. In a crystal oscillator using a tank circuit in addition to the crystal the tank circuit should be tuned to a slightly higher frequency that the resonant frequency of the crystal. This is because

a) The output signal will have low distortion
b) The power development should be shared equally between crystal and tank circuit
c) The total phase shift should be 360° for oscillations to occur
d) Crystal with low drive requirement can be used

54. A RF carrier wave is of 1 V RMS value. It is AM modulated to a depth of 80% by an audio sine wave. After modulation, the lower side band is completely removed. The total power across a 1 Ω load will be (in Watts):

a) 0.84 b) 1.32 c) 1.16 d) 1.8

55. A carrier wave is amplitude modulated by a message signal. The modulation index 'm' is greater than unity. To recover the message signal with least distortion, the demodulator to be used will be

a) Non-linear detector b) Diode detector
c) Square law detector d) Product detector

56. Carrier to noise ratio of an FM receiver at threshold is (in dB)

a) 20 b) 3 c) 6 d) 10

57. The mathematical expression for a siusoidally modulated FM wave is an expanding series of Bessel functions, dependent upon the modulation index 'm' and the modulating frequency 'w'. The energy contained in the wave is

a) independent of m, but dependent on w
b) dependent on both m and w
c) dependent on m, but independent of w
d) independent of both m and w

58. A 1544 KBPS data transmission using QPSK modulation needs an IF bandwidth (in KHz) of

a) 3088 b) 1544 c) 772 d) 2316

59. Bit error rate in a digital communication system can be improved by using

a) pre-emphasis network b) higher level of PSK modulation
c) differential coding d) self-synchronising scrambler

60. Self synchronising scrambler is used in digital transmission to

a) easily recover the clock b) reduce bit error rate
c) introduce secrecy d) reduce aliasing errors

61. The eye in the digital data transmission helps in

a) analysing where sampling is to be done
b) analysing aliasing error
c) aligning cross over jitter
d) finding the received signal level

62. A double balanced mixer is used for

a) Frequency translation d) FM detection
c) AM detection e) PCM detection

63. A FM transmitter of 4 KW is available and it is required to convert into an AM transmitter using high level modulation. Assuming 100% modulation capability what would be the power output the audio modulator amplifier is required to be rated for ?

a) 500 W b) 1 KW c) 2 KW d) 1.5 KW

64. The maximum number of voice channels that can be transmitted by an ISB system is

a] 4 b] 2 c] 8 d] No limit

65. Pre-emphasis and De-emphasis are used in FM communication system to obtain
a) flat frequency response b) noise immunity
c) capture effect d) compensation for treble and bass effects of FM

66. In a given receiver, if the noise figure is increased by 3 dB, the frequency bandwidth is to be reduced to realise the same thermal noise threshold. The bandwidth reduction is by a factor of
a) 3 b) 2 c) 4 d) 6

67. In a receiver, Forward AGC is used to control
a) RF stage gain b) IF stage gain
c) AF stage gain d) Oscillator frequency

68. Noise Figure of a Receiver is largely determined by the noise characteristics of
a) RF amplifier b) Mixer c) IF amplifier d) Local Oscillator

69. In a PCM system using a 7 digit code, the quantizing noise is weaker than the peak signal that can be accommodated by the channel by approximately [in dB]
a) 60 b) 43 c) 53 d) 50

70. A 1 KW HF transmitter is serving a certain region as a communication link. It is proposed to extend the range by converting the transmitter to single side band operation. What would be the advantage in terms of transmitter power in dB
a) No advantage b) 3 c) 6 d) 9

71. A pilot is introduced in FDM transmission to
a) identify various groups of FDM b) indicate transmitter in ON
c) act as adjustable equaliser d) provide AGC in receiver

72. Troposcatter transmission reliability is increased by
a) providing 1 + 1 hot standby techniques
b) diversity techniquas
c) increasing transmitter power to 5 KW
d) using stable local oscillators

73. In cable transmission of multichannel data, repeaters are spaced only 12 KM apart compared to 50 KM in radio realy circuits. This in mainly because
a) slope equalisation requirment can be minimised
b) large power supply requirments can be avoided
c) cable fauits can be pinpointed more accurately
d) line amplifiers with lower output powers can be used

74. The threshold noise (in dBm) of a receiver having 5 dB noise figure and 10 MHz bandwidth is
a) – 99 b) – 89 c) – 72 d) – 60

75. An earth station satellite antenna gives the least tracking error when driven in
a) step track mode b) auto mode
c) manual track mode d) programme track mode

76. Dual conversion down converters are used in satellite earth station receivers because
a) filter realisation is easier and simpler
b) they are frequency sensitive
c) they need narrow band filters
d) they provide low noice in the he receiver

77. The sound IF in the Indian TV receiver is (in MHz)
a) 27.9 b) 38.9 c) 44.4 d) 33.4

78. The deflection system used in the 20 inch TV receiver is
a) magnetic b) Electrostatic
c) Piezoelectric d) Electromagnetic

79. The transistor used in the video output stage of a TV receiver should have an f_T (in MHz) of at least
a) 150 b) 500 c) 5.5 d) 38.9

80. In the luminance matrix used for colour TV, the green component is
a) 100% b) 11% c) 73% d) 59%

81. The colour sub-carrier for a PAL system is
a) 3862 KHz b) 38619 KHz c) 44356 KHz d) 4.434 KHz

82. A radar operating in the Millimeter wave band uses the frequency in the range of (in GHz)
a) 4 — 8 b) >35 c) 1 — 2 d) 12.5 — 18

83. In order to achieve higher range performance, other parameters being equal, a Radar is required to be operated in the
a) Medium frequency band b) Higher frequency Band
c) Lower frequency Band d) None of the above

84. For a cosecant-squared radar antenna, the echo power received from a target at constant range
a) Increases with target altitude
b) Decreases with target altitude
c) Depends on the frequency of the Radar
d) Is independent of target altitude

85. In order to track several targets simultaneously using a track-while-scan radar system, the information is obtained
   a) During every alternate scan of the antenna
   b) Continuously for each pulse
   c) Sometimes continously, sometimes periodically
   d) Periodically

86. A phased array type of radar antenna is used primarily for
   a) Improving from to back ratio
   b) Very slow scanning requirement
   c) Improving side lobe suppression
   d) Fast scanning requirement

87. A radar with a peak power of 10 KW can achieve a maximum detectable range of 20 Km under certain conditions. All other conditions remaining the same, it the peak power is increased to 160 KW, the max. detectable range will be (in Km)
   a) 320 b) 36 c) 80 d) 40

88. For a pulsed radar operating with a pulse width of 1 microsecond, the average power is 20 W. If the pulse width is increased to 1.5 microsecond, the average power will be (all other parameters remaining constant) – in Watts
   a) 20.5 b) 21.5 c) 13.33 d) 30

89. A radar transmitter radiates RF energy in bursts of 1 mictosecond. The typical bandwidth of the IF amplifier of the radar receiver should be (in MHz)
   a) 100 b) 5 c) 10 d) 1

90. The PRF of a radar is 1000 Hz. The maximum unambiguous range of the radar is (in Km)
   a) 75 b) 300 c) 150 d) 125

91. The pulse width of a radar is 1.2 microsecond. The PRF is 1400 Hz. The average power measured is 420 W. The peak power of the radar is (in KW)
   a) 250 b) 500 c) 1000 d) 750

92. A radar display which maps the bearing (azimuth) angle and range on polar co-ordinates is called
   a) B-scope b) A-scope c) PPI d) C-scope

93. In a coherent radar there is phase consistency between successive pulses. Such radars are configured using
   a) Magnetron oscillator b) Master oscillator & TWT amplifier
   c) Reflex klystron d) TWT oscillator

94. A choke flange in a waveguide plumbing helps in
   a) reducing EMI radiation b) reducing transmission loss
   c) better sealing of the plumbing d) pressurising the W/G

95. Isolators in to microwave frequencies commonly use the basic property of
   a) Fleming's right hand rule b) Lenz's law
   c) Piezoelectric interaction d) Faraday's law of rotation

96. A Klystron amplifier has lower bandwidth compared to the TWT because
   a) Klystron operates at lower frequencies
   b) TWT uses helix as RF circuit
   c) TWT uses velocity modulation d) None of these

97. The radiation pattern of a VOR antenna is
   a) A circle b) an ellipse c) A Limacon d) A hyperbola

98. The Adcock antenna
   a) Eliminates errors due to night effect
   b) Is a special type of loop antenna
   c) Has an equivalent height equal to that of a multi-turn loop antenna
   d) Is not sensitive to vertical polarisation

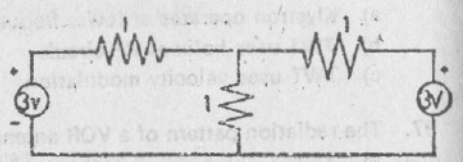
99. For drawing he root locus, we need
   a) C(s)/R(s) b) 1 + G(s)/H(s) c) H(s) d) G(s)

100. In one row of Routh's array, if all entries are zeros, then the system has
   a) Conjugate roots b) All different roots
   c) All same roots d) None of the above

ELECTRONICS IX

1. Two series arm and a shunt arm resistance value of T network is 1 Ohm. Then the one series arm and two shunt arm resistance of equivalent π network is
   a) 1 ohms each b) 3 ohms each
   c) 9 ohms each d) 6 ohms each

2. The value of I flow in the circuit shown
   a) 1A b) 2A
   c) 3A d) 4A

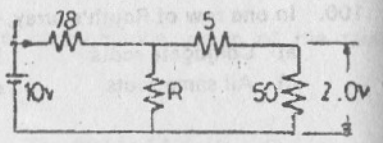


3. The Maxwells bridge is used to measure
   a) Inductance b) Capacitance
   c) All the above d) Permeability

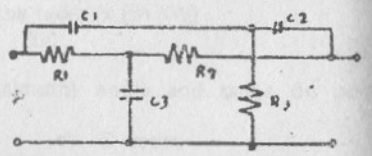
4 Wien bridge is used to measure
   a) Inductance b) Capacitance
   c) Frequency d) Permeability

5. Bandwidth of a series resonant circuit whose resonance frequency is F = 3000 Hz Q = 10 is
   a) 3000 Hz b) 600 Hz c) 300 Hz d) 6000 Hz

6. Find the current through Resistor R and the value of R if voltage across 50 Ohms resistor = 2.0 V and the source voltage = 10v
   a) 0.06A, 36.6 Ω b) 0.06A, 55 Ω
   c) 0.06A, 50 Ω d) 0.6A, 36.6 Ω



7. The input sine wave to the parallel T networke shown below is $E_m \sin \sqrt{1/2R_1 R_3 C_1^2}\, t$ then the output will be
   a) input itself b) input $/\sqrt{2}$
   c) input$/\sqrt{1/2\pi R_1 R_3 C_1^2}$ d) 0



8. Inductance of a conxial line in mH/mile whose internal conductor diameter a and an external conductor of diameter b by the equation
   a) 0.741 $\log_{10}$ b/a b) 0.741 ln b/a
   c) 0.741 × b/a d) b/a u_o

9. A generator of 1.0V, 1000 Hz supplied power to a 1000 mile open wire line terminated in Z_o, and the phase constant is 0.0355 red/mile the velocity of propagation in miles/sec will be
   a) 77000 b) 177000 c) 277000 d) 377000

10. If the distributed parameter of an ideal transmission line inductance is 3670 u H/mile, and capacitance is 8350 pf/mile then the velocity of propagation in miles/sec at a distance of 20 miles from the generator line
    a) 180644 b) 200644 c) 170644 d) 80644

11. The unit power factor resonance will be obtained if the____ is varied for maximum impedance
    a) Resistance b) Capacitance
    c) Inductance d) Frequency

12. Current delivered to the parallel resonance circuit whose Q factor is 10 and the input current from the generator is 50 mA
    a) 5A b) 500 mA c) 250 mA d) 50 mA

13. The ratio of the current in capacitive branch to that in inductive branch of a parallel resonant circuit of Q factor = 6 will be
    a) 0.36 b) 6.0 c) 0.986 d) 1.0

14. Characteristic impedance of a Transmission line at 1000 Hz whose Resistance = 10.4 Ω/mile conductance = 0.8 uυ/mile inductance = 3.67 mH/mile and capacitance = 8350 pf/mile will be
    a) 800 – 12° b) 892, – 24°
    c) 692 – 12° d) 692, + 12°

15. The propagation constant of a Transmission line at 1000 Hz whose Resistance = 10.4 Ω/mile conductance = 0.8 uυ/mile inductance = 3.67 mH/mile and capacitance = 8350 pf/mile will be
    a) 1.363, 78° b) 3.63, 78°
    c) 0.0363, 78° d) 0.0363, –78°

16. The attenuation constant of a distortionless transmission line at 1000 Hz if resistance = 10.4 Ω/miles, conductance = 0.8 u mhos/miles, inductance = 3.67 mH/mile and capacitance = 8350 pf/mile, will be
    a) 0.00289 b) 0.0289 c) 0.289 d) 0.00289, – 12°

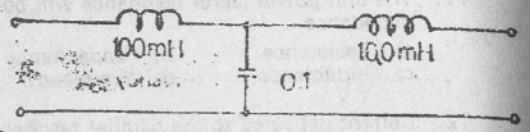
17. A line of finite length, terminated in a load equivalent to its characteristic impedance, appears to the sending end generator as
    a) infinite line b) finite line
    c) undetermined d) unit length line

18. The bandwidth of the parallel resonant circuit whose Q factor at resonance frequency of 10 KHz is 10, resonant resistance 10 KΩ and the source resistance 5 KΩ
    a) 10 KHz b) 6 KHz c) 3 KHz d) 3.75 KHz

19. The band width of the parallel resonance circuit whose Q factor = 10 at resonance frequency = 10 KHz, Resonance resistance = 10 KΩ and the source resistance = 10 KΩ (under matched condition) is
    a) 5 KHz b) 2.5 KHz c) 10 KHz d) 2 KHz

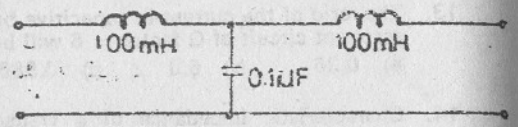
20. One neper is equal to
a) 10.686 dB b) 8.686 dB c) 3.141 dB d) 6.282 dB

21. The value of K of a constant low pass filter network shown is



a) 100×10^3 b) 10×10^{-3} c) 100×10^6 d) 10×10^6

22. The cut-off frequency of the symmetrical low pass network shown is



a) 3.19 KHz b) 6.38 KHz c) 1.59 KHz d) 10 KHz

23. The inductance of a open wire line at Radio frequency if d is the distance between line and a is the radius of the wire is
a) 2π ln.d/a b) $u_o/2\pi$ ln.d/a
b) $2\pi u_o$ ln.d/a d) $1/2\pi\ u_o$ ln.d/a

24. The capacitance C of a open wire line at radio frequency if d is the distance between line and a is the radius of the wire, is
a) πE_v/ln d/a b) $1/\pi E_v$. lm d/a
c) π/E_v. ln d/a d) E_v. ln d/a

25. The maximum and minimum input impedance in ohms of a Transmission line whose SNR = 2.6 and the characteristic impedance Z_o = 300 Ω is given by
a) 300 & 120 b) 750 & 120 c] 750 & 300 d] 120 & 300

26. For the first quarter wave length, a short circuited line acts as
a] a capcitance b] an inductance
c] a resistance d] a conductance

27. For the first quarter wave length, an open circuited line acts as
a] a capacitance b] an inductance
c] a resistance d] conductance

28. The short circuited transmission line act as
a) Parallel resonant circuit b] series resonance circuit
c] K. derived low pass filrer d] m-derived low pass filter

29. The open circuited transmission line acts as a
a] Parallel resonant circuit b] Series resonant circuit
c] K. derived low pass filter d] m-derived low pass filter

30. The characteristic of the reactive component of the short circuited transmission line change from inductive to capactrive alternatively at every wave length of
a) 1/4 b) 1/2 c) 1 d) 3/4

31. The characteristic of the reactive component of the open circuited transmission line change from inductive to capacitive alternatively at every wave length of
(a 1/4 b) 1/2 b) 1 d) 3/4

32. On the open circuited dissipation less transmission line at radio frequncies the phase between the voltage and currents along the line will be
a] 0 b] $\pi/2$ c] π d] 2π

33. On the short circuited dissipation less transmission line at radio frequencies the phase between the voltage in current along the line will be
a] 0 b] $\pi/2$ c] π d] 2π

34. The current and voltage wave along the dissipationless transmission line at Radio frequencies, compared to short and open circuited line will be shifted by a wave length of
a) 1/4 b) 1/2 c) 3/4 d) 1

35. The power delivered to the load, if the transmitted power is 900 W and the standing ratio is 2.0, is
a) 800 Watts b) 900 Watts c) 1000 Watts d) 300 Watts

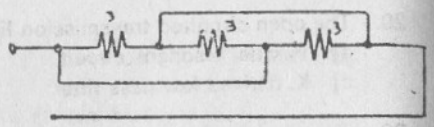
36. The coupling coefficient of a transformer whose primary and secondary inductance are 30 mH and 40 mH respectively and the mutual inductance is 1.732mH, will be
a) 0.5 b) 0.25 c) 0.75 d) 1.25

37. The coupling co-efficient of a transformer will never exceed
a) 0.25 b) 0.75 c) 1.0 d) 1.5

38. The value of m of a low pass m derived filter whose cut-off frequency fc = 3 KHz and the attenuation frequency f_∞ = 4 KHz, will be
a) 1.66 b) 0.66 c) 0.066 d) 2.66

39. If the value of m of a m derived high pass filter is 0.66 and the cut off frequency fc = 3 KHz, then the attenuation frequency f_∞ is
a) 3 KHz b) 1.2875 KHz c) 1.6875 KHz d) 2.25 KHz

40. The current I in the circuit is



a) 1/3 A b) 1A
c) 2A d) 3A

41. An analog signal is band limited to 1000 Hz sampled at the Nyquist rate and the samples are quaniized into 4 levels The quantisation levels Q_1, Q_2, Q_3 and Q_4 are assumed independent and occur with probabilities $P_1 = P_4 = 1/8$ and $P_2 = P_3 = 3/8$. The information rate of the source is
a) 1800 bit/sec b) 3600 bits/sec
c) 5400 bits/sec d) 200 bits/sec

42. If S/N is 7 and the bandwidth is 4000 Hz, then the channel capacity will be 12000 bits/sec if the S/N is increased to 15 and Bandwidth is decreased to 3000 Hz then the channel capacity will be
a) 18000 bits/sec b) 24000 bits/sec
c) 12000 bits/sec d) 15000 bits/sec

43. By Bay's theorem, P(A, B) = P(A) × P(B/A) if A & B are Independent then P(A, B) is
a) P(A) P(B) b) P(B) P(A/B) c) P(A/B) P(B/A) d) P(A)/P(B)

44. If $e^{-jWoN} = 1$ then WoN is equal to
a) $2\pi n$ b) πn c) $2\pi/n$ d) $n/2\pi$ where 'n' is an integer

45. $\{(\cos 5\theta - j\sin 5\theta)(\cos 4\theta + j\sin 4\theta)\} / \{(\cos 6\theta - j\sin 6\theta)\}(\cos\theta + j\sin\theta)^5\}$ is equal to
a) $\cos\theta + j\sin\theta$ b) $2+j1$ c) 1 d) $\cos\theta - j\sin\theta$

46. The convolution $y(n) = x(n) * h(n)$ of the pair of signal $x(n) = a^n u(n)$ and $h(n) = B^n u[n]$ is
a) $B^n a^n$ b) $B^n/1-aB$ c) $-B^n + 1/a-B$ d) $B^n + 1/B-a$

47. Binary number 011 subtracted from binary 101 gives :
a) 010 b) 011 c) 101 d) None

48. Two's complement of a binary number can be found out by :
a) Changing Zero's to One's and adding 1
b) Finding One's complement and adding 1
c) Changing One's to Zero's and adding 1
d) Changing Zero's to One's and adding its complements

49. Decimal number 328 when expressed in BCD code gives :
a) 001100101000 b) 00110101000
c) 0101001001 d) 001101010

50. Decimal number 3 converted into Gray Code gives :
a] 0011 b] 0100 c] 0010 d] None

51. It is desired to have an output given by A+B from available A and B inputs. Logic circuitry needed is :
a] A NAND gate only b] Two NOTS and one OR
c] One AND and one NOT d] NONE

52. Of all the logic families, faster speed is exhibited by :
a] TTL b] CMOS c] ECL d] NMOS

53. MOS and CMOS logic families use :
a] Saturated bipolar transistors
b] Non-saturated bipolar transistors
c] MOS devices d] Mixture of MOS and bipolar devices

54. A clocked JK flip-flop differs from a clocked R-S flip-flop in the respect that :
a] It has entirely different truth-table
b] It avoids the ambiguity arising in the output condition from a 1 – 1 input
c] It is faster d] None

55. A FULL ADDER for 1 binary operation, whether serial or parallel, typically consists of
a] Two half adders b] Four half adders
c] Two half adders and an OR – gate
d] Two half adders and an AND – gate

56. A Register in a digital system is used :
a] For addition of digital data
b] For subtraction ot digitai data
c] For storage of digital data
d] For storage of permanent data

57. To store an n-bit binary number in a register, we require :
a] n flip-flops b] n/2 flip-flop
c] 2n flip – flops d] [n+1] flip-flops

58. If Z = 3 + j4/1 – j2 then it is multiplied by its conjugate, then, ZZ^* is equal to
a] 3 + j4/5 b] 25/1 + j2 c] 5 d] 1

59. If $Z = 5.e^{-j60°}$, then by Eulers notation, it is equal to
a] 2.5 + j1.0 b] 2.5 + j4.33
b] 2.5 – j1.33 d] 2.5 – j4.33

60. $X[n] = \sum_{n=0}^{N} \alpha^n$. where N is finite, then the closed form solution to x[n] is
a] $1/1-\alpha$ b] $1/1+\alpha$ c] $1 + \alpha^{N+1}/1-\alpha$
d] $1-\alpha^{N+1}/1-\alpha$

61. Let x(t) be the input to an LTI system with unit impulse response h(t) = where $x(t) = e^{-at}\, u(t)$ & $h(t) = u(t)$ where $a > 0$, then the output from the above system will be

a) $(1+e^{at})\, u(t)$ b) $(1-e^{-at})\, u(t)$

c) $a.(1-e^{-at})\, u(t)$ d) $(1-e^{-at})\, u(t)/a$

62. The order of the Numerator is less than the Denominator of Laplace transform of transfer function, as the time tend to infinity, then the transfer function will become

a) ∞ b) 0 c) finite value d) All the above

63. For rational laplace transforms, the Region of covergence does not contain any

a) Zeros b) Poles
c) Complex conjugate zeros d) All the above

64. If 'a' in the first order causal linear time invariant system described by the difference equation
$y(n) - ay(n-1) = x(n)$ $o < a < 1$ the system is

a) Low pass b) High pass
c) Band pass d) All pass

65. The discrete closed loop control system shown below has the Pole and Zero at (if B = 3/4

a) 0.5, 0 b) 0.0, 0.5
c) 2.0, 0 d) 0.5, 0.5

66. The discrete closed loop control system if B = 1/4 shown above is

a) stable b) unstable
c) oscillating d) none of the above

67. The dominant pole is the one which is

a) near the imaginary axis
b) away from the imaginary axis
c) on the imaginary axis
d) on the right side of the real axis

68. Signal u (t) = 1, $0 < t < \infty$, the Fourier Transform does

a) not exist b) exist
c) either of the above d) all the above

69. The second order continuous Linear Time Invariant (LTI) system having input x(t), with all initial condition zero, are related by the diffrential equation $d^2 y(t)/dt^2 - dy(t)/dt - 2y(t) = x(t)$. This LTI system is

a) either stable or causal b) stable and causal
c) stable only d) neither stable or causal

70. Consider the sequence x^1 (n) with Z – transform X_1 (z) and a sequence x_2 (n) with Z– transform X_2 (z) where x_1 (n) and x_2 (n) are related by $X_2(n) = X_1(-n)$, then Z transform X_1 (Z) & X_2 (Z) are related by

a) $X_2(z) = -X_1(z)$ b) $X_2(z) = X_1(z)$

c) $X_2(z) = -X_1(1/z)$ d) $X_2(z) = X_1(1/z)$

71. Consider the sequency x_1 (n) with Z – transfarm X_1 (z) and a sequence X_2 (n) with Z– transfrom X_2 (Z) where x_1 (n) and x_2 (n) are related by $x_2(n) = x_1(-n)$, if X_1 (z) has a Pole or Zero at $Z = Z_o$, then X_2 (z) has Pole or Zero at

a) Z_o b) $1/Z_o$ c) $-Z_o$ d) $-1/Z_o$

72. The feed back system with forward gain G(S) = 10 and the feed back gain H(S) = (s+1)/(s+100), then the system will have its Poles and Zeros at

a) –100, –100 b) –1, –100
c) –10, –100 d] –100, –1000

73. An Linear Time Invariant (LTI) system for which the input x(t) and the output y(t) are related by y(t) = dx(t)/dt, the frequency response of the system H(w) is

a) 1.0 b) 0 c) jw d) 1/jw

74. The sum of the series $1 + (-1/2) + (-1/2)^2 + \ldots\ldots \infty$ is

a) 1 b) –2/3 c) –3/2 d) 3/2

75. The average Torque developed by a separately excited DC Servo motor if the voltage constant is 0.182 V/rpm at 1200 rpm and the armature current is 50 A is

a) 9.1 b) 91.0 c) 87.0 d) 8.7

76. Separately exited DC Servo motor is controlled by a single phase full convertor. The rated armature currents 50 A and the Armature resistances is 0.3 Ω. The supply voltage is 260 V, 50 Hz. The firing angle of the thyristor full convertor is 30°. The back emt any developed by the motor is approximately.

a) 245 V b) 207 V c) 197 V d) 187 V

77. Bolometer is used to measure power in the range of

a) <1 W b) 10 W to 2 W c) 50 W to 100 W d) >100 W

78. Power delivered to the load in the circuit shown is

a) 450 mW b) 300 mW c) 283 mW d) 483 mW

ANSWER ELECTRONICS – I

1. c)	11. c)	21. d)	31. d)	41. a)	51. d)	61. b)	71. a)	81. c)	91. c)
2. a)	12. b)	22. d)	32. a)	42. a)	52. b)	62. b)	72. a)	82. b)	92. a)
3. a)	13. b)	23. c)	33. b)	43. b)	53. c)	63. a)	73. b)	83. a)	93. b)
4. c)	14. d)	24. b)	34. c)	44. b)	54. c)	64. b)	74. a)	84. a)	94. c)
5. a)	15. c)	25. b)	35. c)	45. d)	55. b)	65. c)	75. b)	85. c)	95. a)
6. b)	16. a)	26. d)	36. d)	46. c)	56. c)	66. d)	76. a)	86. c)	96. a)
7. b)	17. c)	27. c)	37. c)	47. d)	57. b)	67. c)	77. b)	87. c)	97. b)
8. b)	18. d)	28. b)	38. c)	48. a)	58. b)	68. b)	78. a)	88. c)	98. b)
9. b)	19. c)	29. d)	39. a)	49. b)	59. a)	69. d)	79. a)	89. b)	99. b)
10. d)	20. b)	30. c)	40. a)	50. b)	60. a)	70. a)	80. b)	90. a)	100. c)

ANSWER ELECTRONICS – II

1. c)	11. a)	21. a)	31. d)	41. b)	51. a)	61. c)	71. c)	81. c)	91. a)
2. a)	12. c)	22. c)	32. d)	42. b)	52. c)	62. b)	72. c)	82. c)	92. d)
3. a)	13. b)	23. c)	33. c)	43. a)	53. b)	63. a)	73. b)	83. a)	93. b)
4. b)	14. a)	24. a)	34. d)	44. b)	54. b)	64. a)	74. c)	84. a)	94. a)
5. a)	15. a)	25. b)	35. a)	45. b)	55. b)	65. a)	75. a)	85. b)	95. b)
6. b)	16. a)	26. b)	36. c)	46. a)	56. b)	66. d)	76. c)	86. d)	96. d)
7. d)	17. a)	27. c)	37. a)	47. a)	57. c)	67. b)	77. a)	87. a)	97. a)
8. d)	18. d)	28. d)	38. d)	48. b)	58. d)	68. b)	78. d)	88. a)	98. b)
9. a)	19. c)	29. b)	39. a)	49. b)	59. b)	69. a)	79. d)	89. c)	99. d)
10. b)	20. b)	30. c)	40. a)	50. b)	60. c)	70. b)	80. a)	90. a)	100. a)

ANSWER ELECTRONICS – III

1. a)	11. c)	21. c)	31. d)	41. c)	51. a)	61. c)	71. d)	81. d)	91. a)
2. c)	12. d)	22. b)	32. b)	42. a)	52. d)	62. a)	72. b)	82. a)	92. a)
3. b)	13. d)	23. b)	33. c)	43. b)	53. d)	63. a)	73. d)	83. c)	63. b)
4. c)	14. a)	24. c)	34. b)	44. c)	54. a)	64. b)	74. b)	84. c)	94. b)
5. b)	15. c)	25. b)	35. b)	45. c)	55. b)	65. a)	75. b)	85. a)	95. a)
6. b)	16. d)	26. c)	36. d)	46. d)	56. a)	66. b)	76. c)	86. d)	96. c)
7. d)	17. b)	27. c)	37. b)	47. d)	57. c)	67. c)	77. a)	87. a)	97. b)
8. c)	18. c)	28. c)	38. a)	48. b)	58. b)	68. a)	78. b)	88. d)	98. b)
9. c)	19. a)	29. b)	39. a)	49. b)	59. a)	69. d)	79. b)	89. d)	99. a)
10. d)	20. b)	30. c)	40. a)	50. d)	60. b)	70. b)	80. d)	90. c)	100. a)

ANSWER ELECTRONICS – IV

1. b]	11. b]	21. b]	31. b]	41. d]	51. c]	61. a)	71. d]	81. c]	91. b]
2. c]	12. b]	22. b]	32. c]	42. d]	52. b]	62. b]	72. b]	82. a]	92. b]
3. d]	13. c]	23. c]	33. b]	43. a]	53. d]	63. d]	73. d]	83. b)	93. c]
4. d]	14. a]	24. b]	34. b]	44. b]	54. b]	64. b]	74. c]	84. b]	94. a]
5. a]	15. c]	25. a]	36. a]	45. c]	55. b]	65. a]	75. d]	85. c]	95. c]
6. a]	16. c]	26. d]	36. a]	46. d]	56. d]	66. c]	76. c]	86. a]	96. b]
7. a]	17. a]	27. a]	37. c]	47. a]	57. d]	67. b]	77. a]	87. c]	97. a]
8. a]	18. a]	28. c]	38. d]	48. c]	58. a]	68. b]	78. c]	88. c]	98. c]
9. b]	19. b]	29. b]	39. b]	49. a]	59. a]	69. c]	79. b]	89. d]	99. b]
10. c]	20. b]	30. b]	40. a]	50. c]	60. a]	70. b]	80 c]	90. c]	100. a]

ANSWER ELECTRONICS – V

1. d]	11. d]	21. d]	31. b]	41. b]	51. a]	61. c]	71. d]	81. d]	91. b]
2. b]	12. c]	22. d]	32. a]	42. c]	52. d]	62. a]	72. d]	82. d]	92. c]
3. a]	13. c]	23. c]	33. d]	43. c]	53. c]	63. c]	73. a]	83. c]	93. d]
4. b]	14. b]	24. a]	34. c]	44. c]	54. c]	64. b]	74. b]	84. d]	94. b]
5. a]	15. c]	25. a]	35. d]	45. c]	55. c)	65. c]	75. d]	85. b]	95. b]
6. b]	16. c]	26. b]	36. d]	46. c]	56. d]	66. b]	76. b]	86. c]	96. c]
7. d]	17. c]	27. d]	37. b]	47. d]	57. c]	67. a]	77. b]	87. a]	97. a]
8. c]	18. a]	28. d]	38. a]	48. c]	58. c]	68. a]	78. c]	88. d]	98. d]
9. c]	19. b]	29. b]	39. c]	49. c]	59. c]	69. a]	79. a]	89. b]	99. c]
10. a]	20. d]	30. d]	40. a]	50. a]	60. a]	70. b]	80. a]	90. b]	100. c]

ANSWER ELECTRONICS – VI

1. b)	11. d)	21. a)	31. a)	41. a)	51. a)	61. a)	71. b)	81. b)	91. b
2. d)	12. c)	22. a)	32. a)	42. b)	52. c)	62. c)	72. b)	82. b)	92. a
3. b)	13. c)	23. d)	33. b)	43. a)	53. a)	63. b)	73. b)	83. c)	93. b
4. d)	14. b)	24. d)	34. a)	44. d)	54. b)	64. b)	74. b)	84. a)	94. a
5. d)	15. c)	25. a)	35. c)	45. d)	55. d)	65. b)	75. d)	85. c)	95. c
6. c)	16. a)	26. b)	36. c)	46. d)	56. c)	66. b)	76. c)	86. a)	96. c
7. b)	17. a)	27. c)	37. d)	47. b)	57. b)	67. c)	77. c)	87. c)	97. b
8. c)	18. b)	28. d)	38. c)	48. d)	58. d)	68. d)	78. b)	88. b)	98. a
9. b)	19. c)	29. d)	39. a)	49. c)	59. c)	69. d)	79. a)	89. b)	99. c
10. d)	20. c)	30. c)	40. a)	50. a)	60. b)	70. b)	80. d)	90. c)	100. b

ANSWER ELECTRONICS – VII

1. a)	11. d)	21. b)	31. a)	41. d)	51. c)	61. a)	71. c)	81. b)	91. d)
2. c)	12. a)	22. b)	32. b)	42. c)	52. b)	62. a)	72. b)	82. c)	92. d)
3. c)	13. a)	23. c)	33. d)	43. b)	53. b)	63. a)	73. b)	83. b)	93. d)
4. c)	14. a)	24. b)	34. a)	44. a)	54. b)	64. b)	74. c)	84. a)	94. a)
5. d)	15. c)	25. c)	35. a)	45. b)	55. b)	65. c)	75. a)	85. a)	95. a)
6. c)	16. d)	26. a)	36. c)	46. d)	56. c)	66. a)	76. d)	86. c)	96. a)
7. b)	17. d)	27. d)	37. b)	47. c)	57. a)	67. c)	77. a)	87. b)	97. c)
8. c)	18. c)	28. d)	38. b)	48. a)	58. c)	68. a)	78. c)	88. c)	98. a)
9. b)	19. b)	29. c)	39. d)	49. a)	59. c)	69. a)	79. c)	89. b)	99. a)
10. b)	20. a)	30. a)	40. b)	50. a)	60. a)	70. a)	80. c)	90. b)	100. a)

ANSWER ELECTRONICS – IX

1. b)	11. b)	21. a)	31. a)	41. b)	51. b)	61. a)	71. b)
2. b)	12. b)	22. a)	32. b)	42. c)	52. a)	62. b)	72. c)
3. c)	13. c)	23. b)	33. b)	43. a)	53. c)	63. b)	73. c)
4. c)	14. c)	24. a)	34. a)	44. a)	54. b)	64. a)	74. d)
5. b)	15. c)	25. b)	35. a)	45. c)	55. d)	65. d)	75. b)
6. a)	16. a)	26. b)	36. a)	46. c)	56. c)	66. b)	76. d)
7. d)	17. a)	27. a)	37. c)	47. a)	57. a)	67. a)	77. a)
8. b)	18. c)	28. a)	38. b)	48. b)	58. c)	68. a)	78. c)
9. c)	19. d)	29. b)	39. d)	49. a)	59. d)	69. d)	
10. a)	20. b)	30. a)	40. d)	50. c)	60. d)	70. d)	

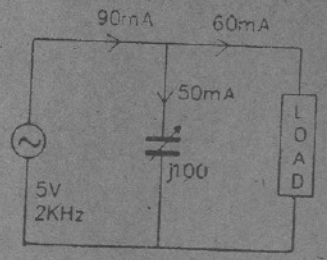


Fig. for Question No. 78 of Electronics IX

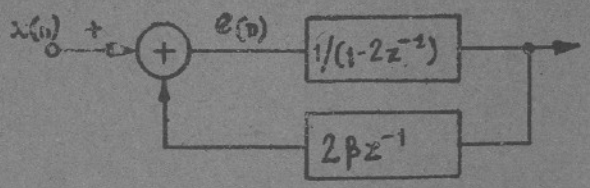


Fig. for Question No. 65 & 66 of Electronics IX